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AN ANALYSIS OF THE ANTHROPOMETRIC MEASUREMENTS OF THE U.S. NAVY MALE RECRUIT IN ORDER TO IMPROVE GARMENT AND PATTERN DESIGN

The University of North Carolina at Greensboro PH.D. 1985

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AN ANALYSIS OF THE ANTHROPOMETRIC MEASUREMENTS OF THE U.S. NAVY MALE RECRUIT IN ORDER TO IMPROVE GARMENT AND PATTERN DESIGN

BY

RICHARD A J RANIERI

A Dissertation Submitted to
the Faculty of the Graduate School at
the University of North Carolina at Greensboro
In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
1985

Approved by

Melvin L. Hamrick
Dissertation Adviser

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

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March 15, 1945
Date of Acceptance by Committee

March 15, 1945
Date of Final Oral Exam

RANIERI, RICHARD A.J., Ph.D., An Analysis of the Anthropometric Measurements of the U.S. Navy Male Recruit in Order to Improve Garment and Pattern Design. (1985) Directed by Melvin J. Hurwitz.

The objectives of this study are, first, to improve the clothing and pattern designs of the U.S. Navy male recruits by utilizing anthropometric data, and second, to propose a tariff improvement, if possible.

The establishment of a bridge between the anthropometric data and the patternmaker or designer was required. Statistical data of the mean and standard deviation were utilized to identify the range of generic stature sizing for the upper and lower torso garments. These same statistical tools were used to identify the range of generic body type sizes for the full torso garment. The median was utilized for individual garment sizes including the identification of bench marks for pattern and garment design.

An improved range of generic sizes was established for stature. The key variable for full torso type garments was identified as vertical trunk circumference and chest circumference. From there a new range of generic size for body type was established.

The use of statistical analysis of other body measurements associated with garment design will provide for an improved fit. These same statistical procedures indicate that, in all cases except the new coverall, the tariff required to support 90% of the population can be reduced.

Statistical analysis of data does provide the much needed bridge between anthropometric measurements and the patternmaker or designer. Statistical analysis also provides a key in reducing the tariff by identifying dead inventory.

ACKNOWLEDGEMENT

I wish to express my sincere appreciation and gratitude to all those people who helped make this study possible.

To Dr. Melvin D. Hurwitz, major advisor for his patience, encouragement, guidance and invaluable assistance in the preparation of this dissertation.

To the members of my advisory committee, Dr. Billie Oakland, Dr. Mary Maccini and Dr. Nicholas Williamson, who gave generously of their advice, support, and encouragement, I am especially thankful.

I would also like to express my sincere gratitude to my wife Norma Ranieri, whose encouragement, understanding and support made my graduate work a reality.

I would also like to express my appreciation for the support I received from Mr. Duwayne Carlson, Mr Tom Churchill, and Dr. Charles Clauser.

I wish also to extend a special appreciation to Dean George C. Griffin, past Dean of Men, Georgia Institute of Technology, for believing in me as a student.

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CHAPTER 1

INTRODUCTION

Clothing System

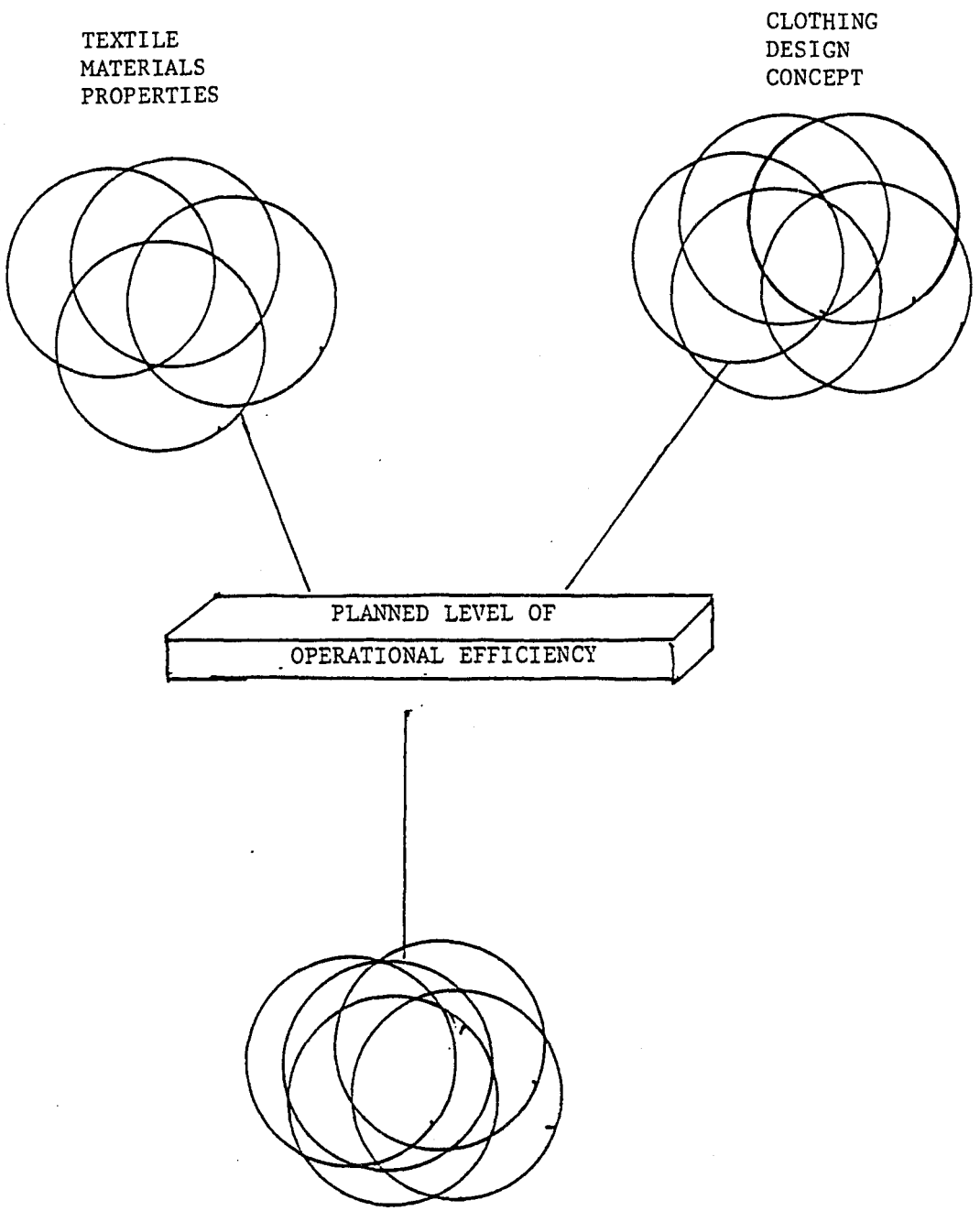
Most people are familiar with the term "Fire Triangle." It consists of the three legs of heat, oxygen, and a combustible material. Together one has the ingredients to support a fire. If any one leg of the triangle is removed, the ability to support combustion is eliminated, because each leg is interrelated.

A correlation to this triangle concept is made by Kennedy, Weiner, and Bailey in the "Soldier's Textile Materials System" as reflected in Figure 1.[1] The three legs of this triangle are textile material properties, clothing design concepts, and the human body and mind. In the textile material properties, Kennedy is referring to the fibers, the fabric and the finishes relating to the physical properties of the garment itself.[2] The human body and mind refer to the environment in which the soldier must function. These, in effect, refer to the environments -- physical, psychological, climate and enemy-imposed. The last leg, clothing design concepts, encompasses

---

[1] S.J. Kennedy, L.I. Weiner, and T.L. Bailey, Textile Materials Systems and the Soldier (Natick, Mass.: U.S. Army Quartermaster Research and Engineering Center, Textile, Clothing and Footwear Division, 1959), p.2.

[2] S.J. Kennedy, Textile Materials Systems And The Solider, (Natick, Mass., U.S. Army Quartermaster Research and Engineering Command, Sept. 1960), P.1.



THE SOLDIERS TEXTILE
MATERIAL SYSTEM

FIGURE 1

concept of fit, fashion, balance of garment (specific geometry of clothing about the man), anthropometric measurements, and other "... properties created in garment structures by design and construction."[3] If any one leg of this triangle is removed, the results are discomfort, poor fit, and a collapse of the clothing system.

In lieu of the Kennedy Triangle,this author chooses to use a Venn diagram (see Figure 2). Since this system is not limited to the military, it is termed the" Clothing System." The Venn diagram was selected because one can portray subsets as they relate to a major segment. Figure 3 is a view of a subset which deals with the clothing design concept segment. In establishing the position of the specific subset dealt with in this paper, the segment "Clothing Design Concept" is portrayed in Figure 3. The following subsets constitute the primary:

1. Concept of fit: the designer's idea of how a garment should fit and drape on a person
2. Fashion: the current styling of garments
3. Balance of garment: the special geometry about the body
4. Anthropometric measurement: the dimensions of various segments of the body

This paper deals with the subset of anthropometric measurements.

This study limits itself to the clothing design concept segment of the "Clothing System." In particular, it focuses on the anthropometric measurements subset as it relates to pattern and garment design for the U.S. Navy male recruit.

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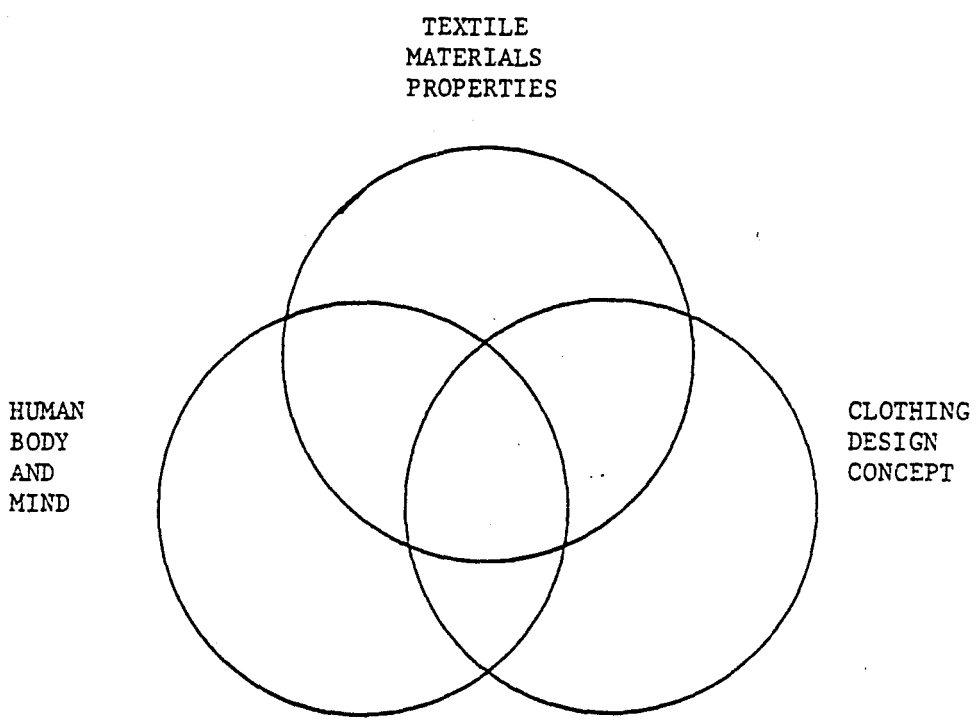
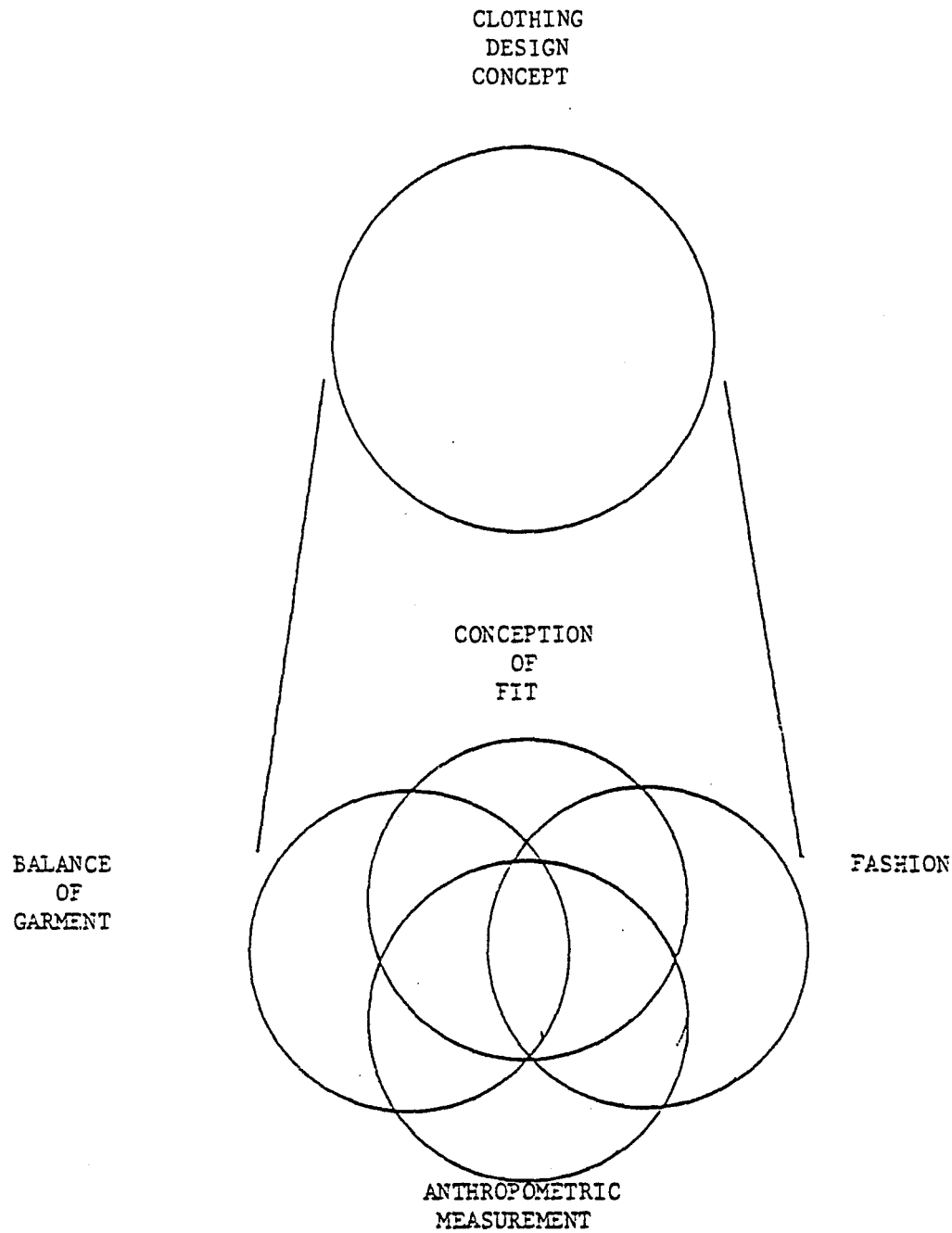
[3]Kennedy et al., p.37.



THE CLOTHING SYSTEM

FIGURE 2



CLOTHING DESIGN CONCEPT SEGMENT

FIGURE 3

Background

The importance of anthropometric measurements to improve the uniform fit of the male navy recruit was highlighted in 1976, when a study group was established by the Chief of Naval Personnel (Chief NavPers). The objective of this study group was to look into the fit of the initial issue.

> The initial uniform requirements for enlisted personnel will be provided at the Recruit Training Centers. Officers will be provided an initial uniform allowance to supplement the purchase of uniforms.[4]

The initial issue is also referred to as "Initial Monetary Clothing Allowance Item" based on the dollar value as reflected in Table 1. It is also referred to as "bag allowance" because all items fit in the recruit's duffle bag. It should be noted that Table 1 was in effect for Fiscal Year 1981.

The study took place at the three Recruit Training Centers (RTC) at Great Lakes, Illinois; San Diego, California; and Orlando Florida. The findings of this study group were of major importance to this paper, as follows:

a. The tailor at one RTC only ordered regular, long, and extra long uniforms. His intent was two-fold: first, he could reduce the range of inventory required because no short was carried; second, he found it easier to make a garment smaller than to make it larger.

---

[4]U.S. Navy, U.S. Navy Uniform Regulations (Washington, D.C.: U.S. Navy, 1981), pp. 1-5.

TABLE 1

Revision 3

INITIAL MONETARY CLOTHING ALLOWANCE ITEMS
FISCAL YEAR 1981
NAVY - MEN'S

NSN/FIA MAGIC SERIES	ITEM	QUANTITY FY 81	UNIT PRICE 10/1/79	UNIT PRICE 10/1/80	MONETARY ALLOWANCE NET CHG	MONETARY ALLOWANCE 10/1/80
8465-00-141-0932/08 02855-101	Bag, Duffel, OD	1	10.40	10.10	(.30)	10.10
8440-00-412-2309/04 04525-101	Belt, Web, Cln, Blk, w/Silver Clip	2	.77	.62	(.30)	1.24
8340-00-412-2326/04 04625-101	Buckle, Web, Belt, Silver	1	.77	.62	(.15)	.62
8315-00-593-6778/08 06060-102	Cap, Util, Pop, Cln/Poly, Bl	2	.32	.36	.08	.72
8405-00-229-8611/04 09050-101	Cap, Knit, Wl, Bl	1	1.82	1.79	(.03)	1.79
8405-01-096-1074/04 08550-100	Drawers, Cln, Boxer, Wh	1	2.06	1.88	(.18)	1.88
8429-00-166-5830/08 30960-101	Gloves, Lea, Blk	6	1.06	1.16	.60	6.96
8430-00-139-5291/03 41820-101	Group, Rate, Mark, Emb, Blk	1	9.51	13.40	3.89	13.40
8455-01-004-8916/82 44050-100	Group, Rate Mark, Pop, Cln/Poly, Wh	3	.23	.16	(.21)	.48
8455-01-012-6581/82 43955-101	Jacket, Util, Pop, Cln/Poly, Bl	3	.25	.21	(.37)	.63
8405-00-229-8556/04 51220-101	Necktie, Blk	0	15.40	-0-	(15.40)	-0-
8440-00-316-2519/08 59225-101	Overcoat, Mel, Wl, Bl, (Peacoat) EM	1	1.47	1.43	(.04)	1.43
8405-00-320-1520/04 24000-101	Raincoat, Pop, Cln/Poly, Bl	0	55.00		(55.00)	
8405-00-204-3326/04 67250-101	Shirt, Util, SS, Cln/Poly, Bl	1	19.90	20.80	.90	20.80
8405-01-005-6779/04 70460-101	Shirt, SS, Pop, Cln/Poly, Conv Collar	4	5.69	5.87	.72	23.48
8405-01-019-7654/04 70527-101	Shirt, Plain, Poly/Ryn, Bl	3	4.56	5.54	2.94	16.62
8105-01-012-3472/04 70620-101	Shoe, Dress, Blk	2	8.58	8.49	(.18)	16.98
8430-00-559-4228/34 71040-101	Shoe, Safety, Chukka	1	14.80	21.20	6.40	21.20
8430-01-078-9260/34 71600-087	Shoes, Gym, Low	1	17.80	24.50	6.70	24.50
8430-00-257-3732/34 71520-110	Socks, Cln/Nyl, Blk	1	7.07	7.61	.54	7.61
8440-00-543-7773/08 79990-101	Socks, Cln/Nyl, Wl, Blk, Cush Sole	8	.58	.59	.08	4.72
8440-00-543-7777/08 79660-101	Sweater, Wl, Blue	3	1.28	1.23	(.15)	3.69
8405-01-005-2550/04 86651-101	Towel, Bath, Cln, White	1	9.47	12.20	2.73	12.20
7210-00-128-8929/08 96190-101	Trousers, Util, Cln/Nyl, Bl	4	1.32	1.36	.16	5.44
8405-00-043-3201/04 97065-101	Trousers, Tw, Cln/Poly, Wh	3	8.22	9.36	3.42	28.08
8405-00-196-2130/04 96770-101	Overcoat (Peacoat)	0	8.24	-0-	(16.48)	-0-
8405-01-082-3540/04 24000-101		1	-0-	60.00	60.00	60.00

TABLE I (Cont)

Revision 3

INITIAL MONETARY CLOTHING ALLOWANCE ITEMS
FISCAL YEAR 1981
NAVY - ENLISTED

	NSN/FIIA MAGIC SERIES	ITEM	QUANTITY FY 81	UNIT PRICE 10/1/79	UNIT PRICE 10/1/80	MONETARY ALLOWANCE NET CHG	MONETARY ALLOWANCE 10/1/80
**	8405-01-009-7157/04 96691-101	Trousers, Trop, Poly/Wl, Bl	3	12.10	13.00	14.80	39.00
	8405-01-007-0696/04 96931-101	Trousers, Srg, Bl	0	16.80	-0-	(16.80)	-0-
	8415-00-904-5130/04 97205-101	Trunks, General Purpose, Tan	1	3.29	3.77	.48	3.77
	8420-00-543-6644/00 97660-102	Undershirt, Ctn, Wh	6	1.03	1.19	.96	7.14
	8405-01-076-0692/04 45195-101	Hat, White	4	2.32	2.32	-0-	9.28
	8405-01-076-1901/04 52074-101	Jumper, Blue Dress	1	22.70	24.10	1.40	24.10
	8405-01-076-1943/04 52068-101	Jumper, White Dress	1	5.61	5.61	-0-	5.61
	8440-01-076-0779/04 59121-101	Neckerchief, Blk	1	2.27	4.57	2.30	4.57
	8405-01-076-5992/04 96929-101	Trousers, Bl, Srg, Broadfall	1	21.50	21.50	-0-	21.50
	8405-01-076-0711/04 96771-101	Trousers, Gabardine Iw Poly Wh	3	8.37	8.37	16.74	25.11
	NSN Being assigned	Group Rate Mark Poly/Iw Wh	1	-0-	.21	.21	.21
*	8405-01-076-9166/04 96693-101	Trousers, Trop Poly/Ul Bl	0	-0-	12.50	-0-	-0-
	8405-01-073-8123/04 51220-101	Jacket Ulll Blue 3329	1	-0-	17.60	17.60	17.60
	Net Change Plus or Minus ( )					38.06	
	Total Monetary Allowance						442.46

* Deletion
** Addition
*** Change In Allowance
**** Nomenclature Change
***** Change in Unit Price

b. The tailor at another RTC felt that the amount of "ease" built into the design of the garment was too much. He chose to issue a smaller uniform and let out the garment. He felt recruits should look sleek and trim.[5]

(The term "ease" refers to "the amount of dimension over body measurements to allow for comfort and freedom of movement."[6] The fashion style dictates the amount of ease built into an article of clothing or footwear.)

c. The tailor at the third RTC came closest to a proper fitting the male recruit. His major difficulty arose in attempting to apply strict generic sizing strictly based on height. The term generic size relates to the descriptive term of short, regular, long, etc., when pertaining to stature, as in the coat or trouser sizing, e.g., 38 regular; or as small, medium, large, etc., when pertaining to a body type, as in coveralls.[6] This generic size is normally associated with a height; e.g., a 5'10" individual with a 36 inch chest is a 36 regular. This tailor would not take into account the rest of body distribution and the fact that a 36" long may have fit the recruit better. This type of misuse of the

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[5]Cdr. R.A.J. Ranieri, Ben Di Fazio, et al., Chief Naval Personnel Study Group on Outfitting of Recruits, May-October 1976. (This was a written report submitted by USNAVTRAIGRP; no copy available.)

[6]Interview with Seymour Lash, Director Clothing Development Division, U.S. Navy Clothing and Textile Research Facility, Natick, Massachusetts, July 1982.

sizing system still continues. Mr. Moitoza provided data on the blue work shirt procured by the U.S. Navy from the Defense Personnel Support Center. During the first quarter of FY85 (Oct, Nov, Dec 84) 60,848 blue work shirts were sold to the Navy. Approximately 78%, over 47,600 shirts, were in the half size (14½, 15½, etc.), while only 22% were whole sizes (14, 15, 16, etc).[7] Based on the data in Chapter IV of this paper, a more normal distribution, close to 50% for each, would be more accurate.

When outfitting of the male recruits is performed in this manner several major problems arise. First, a distorted set of demand, by size, is built into the clothing tariff. A clothing tariff is "the number of garments of each size which must be provided for a given population."[8]

A tariff is established initially on a newly designed garment or for a new store. Once sufficient demand is built up, this number replaces the original tariff. Since procurements not only in the military but also in the civilian business world are built around demand, the tariff changes. Second, and more important, is the fact that the recruit may feel uncomfortable in the uniform. Thus the clothing design leg of our clothing system. (Figure 2) is broken. The result is that the recruit tries to buy a better fitting uniform from

---

[7]Interview with Moitoza, David, Technical Division Director, Navy Clothing and Textile Research Facility, Philadelphia Unit, Philadelpha, PA, Jan. 1985.

[8]U.S. Navy Clothing and Textile Research Facility, Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design, Technical Report No. 138 (Natick, Mass.: U.S. Navy, 1979), p. 75.

the Navy Exchange or a civilian tailor shop, spending out-of-pocket money he can ill afford. A third factor is the increased number of minorities entering the naval services. Little attention has been paid to their anthropometric differences. Again, referring to the proper fit, these body measurement differences should be taken into account.

The issue and sale of uniforms, based on the tailors' concept of fit, builds a distorted picture which also impacts on the designer and pattern maker. Based on this distorted demand, the designers' concept of fit is reinforced. This, then, is built into future articles of uniform and protective clothing.

To insure that the Navy was not singly out of step, designers and pattern makers from the other services --Army, Air Force, Marine Corps, and Coast Guard-- were contacted or visited. Several pattern-makers and tailors from civilian industry were also contacted. It was found that each had his own concept of size and fit. This was reaf-firmed on a visit to Leaburey's, a male clothing manufacturer, in July 1983. Attilio Balestra, the chief designer, indicated Leaburey's produces men's suits, sports jackets, and trousers for five different firms, including Brooks Brothers, as well as its own brand. The patterns for each firm varied in measurements from 1/4" to 1".

When asked what measurement he uses as a standard to grade from, Atillio stated, "I use a 40 regular because I am a 40 regular. I take the measurements that I am comfortable with and grade up and down. A designer or pattern maker will use his measurements or some specific model for the standard." He further indicated that this was one of the

major problems in the "business" because of the lack of knowing actual body size and standardization.

Further evidence of the problem of lack of knowledge of the human body can be seen in the following quotations from textbooks on fashion, design, and grading techniques. First from Price and Zamkoff:

> Every woman has had the experience of selecting from a rack of dresses marked in her size, only to find when trying them on that the fit varied from dress to dress. One of the reasons for this is that dresses are designed for a standard or model size and then graded up to larger sizes and down to smaller sizes, the result depending upon the skill of the grader. The grade is mechanically scaled up and down in proportion, but the human body unfortunately does not always grow according to standard measurements. Thus, the proportion of the pattern will vary according to the experience, the accuracy, and the personal judgment of the grader.[9]

Gioello and Berke stated:

> Our research has shown that due to the lack of mandatory standards regarding sizing, garments within a particular range and figure type vary from company to company and from one type of garment to another. We also discovered that within manufacturing companies the sizes of garments and their relationship to garment measurements, with regard to the size and type of person who could wear the garment, are inconsistent.[10]

From this the author concluded that the size and measurements of the body were in the mind of the designer, pattern maker, or tailor and each was different.

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[9]Jeanne Price and Bernard Zamkoff, Grading Techniques for Modern Design (New York: Fairchild Publications, 1974), p. 3.

[10]Debbie Ann Gioello and Beverly Becke, Figure Types and Size Ranges (New York: Fairchild Publications, 1979), p. vii.

At the American Society of Texting Materals (ASTM) meeting in March 1982, the Task Group on Sizing (13.54.03) from both military and industry, highlighted the need to standardize sizes of garments, infant through adult, male and female.[11] This committee was still attempting to define standardized sizes. Personnel from industry indicated a dire need for sizing information from the military anthropometric studies.

Objectives

The importance of anthropometric data to improve clothing and pattern design was recognized by this author when he was assigned as the Officer in Charge of the U.S. Navy Clothing and Textile Research Facility. In 1976, this author programmed, had funded, and initiated the Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design, which was published in March 1979.[12] In 1977, this author initiated the collection of anthropometric data on 562 U.S. Navy male recruits.

The objective of both studies was to improve clothing and pattern design through the use of anthropometric data. The author knew that nothing had been done with the 1977 data nor the Navy segment of the 1966 Armed Forces study. Therefore, a request was made to the Commander, Naval Supply Systems Command, to utilize this data. The response(Appendix A) indicated the 1977 data was lost but authorized the use of the 1966 data.

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[11] ASTM Meeting, "Task group on Sizing". Paper presented at ASTM meeting, Williamsburg, Virginia, March 7-12, 1982.

[12] U.S. Navy Clothing and Textile Research Facility, Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design. (Natick, Mass., 1979).

Although the 1966 data are 19 years old at this writing, they are still considered valid and useful because they are the most recent data

available on the male navy recruit population on a large scale. The basic intent was to devise a more rational grading system for male navy recruits. Based on an Air Force study covering authropometric surveys of 1952, 1965 and 1981 there was an increase among recruits in the mean stature of approximately one-half inch and ten (10) pounds in weight.[13] In the author's experience this distribution over garment design is not significant. Thus, the change over 19 years would even be less significant. The objectives of this independent study are the following:

1. To improve the clothing and pattern design of the U.S. Navy male recruit by utilizing the anthropometric data to develop
   a. interval tables
   b. frequency tables
   c. percentile tables
   d. tables of statistical values, and,
   e. bivariate tables
2. To propose tariff improvements, if possible, through the use of the bivariate tables.

From the background section, one can see that an anthropometric sizing analysis should assist both the military and the civilian

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[13]Joe W. McDaniel, Richard J. Skandis, and Scott W. Madole, Weight Lift Capabilities of Air Force Basic Trainees, AFAMRL - TR - 83 - 0001 (Wright-Patterson Air Force Base Office Aerospace Medical Research Laboratories, AF Systems Command, 1983), p. 35.

industries. Alexander, McConville, and Tebbetts described an anthropometricsizing analysis as "...based on the concept of dividing the population into subgroups of individuals who are more or less similar in certain relevant body size dimensions (e.g., tall and slender, short and heavy) and then analyzing the anthropometric data for these subgroups to arrive at appropriate dimensional design values which will accommodate the size variability within each group."[14]

Arraying the data in a meaningful manner to clothing designers and patternmakers should improve the fit of the garments. It should also provide an improved tariff for procurement and inventory.

Anthropometric Sizing Steps

There are several approaches which can be taken in establishing body sizes for garments. The simplest and probably least satisfactory is to force the body to fit the design. In this method a designer develops a garment or work environment and then only those personnel who have the proper body dimensions wear the garment or fit into the work space. This method is used for fashion shows. The newly designed apparel will accommodate a limited body range. This is one of the reasons fashion models fall within restricted body parameters. McConville highlighted another product design for body size in that the Army Air Corps fighter pilots, prior to World War II "... were limited to 70 inches in stature

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[14]Milton Alexander, John T. McConville, and Ilse Tebbetts, Revised Height/Weight Sizing Programs for Men's Protective Flight Garments, AMRL-TR-79-28 (Wright-Patterson Air Force Base, Ohio: Aerospace Medical Research Laboratory, Air Force Systems Command, 1979), p.6.

and 180 pounds in weight in order to gain maximum performance from fighter aircraft."[15] It can readily be seen that this sizing method has definite limiting factors. Customers who have the proper body parameters such as fashion models would be very happy with the fit, but clientele will be limited.

Another method is the "tailor-mades." This is just the opposite of the first in that the garment is designed around the individual body. Here the fit is perfect and the cost is high, because the time required to fabricate the garment is lengthy. Time and cost cancel out this approach in the outfitting of recruits at the training centers. The cost would be triple that of current issue uniforms, and the garments would never be completed in the nine weeks before graduation.

The approach that appears to have a high degree of acceptability is the anthropometric survey. In this method, specific anthropometric data are collected on a statistical sampling of a population. The data are utilized to improve clothing and pattern designs and to develop an improved sizing tariff.

The anthropometric survey method was proposed by the Defense Supply Agency (DSA), now the Defense Logistics Agency (DLA), to the U.S. Armed Forces in 1964. The objectives, according to White, were "achieving improvements in the sizing, fit, tariffing, distribution, and

---

[15]John T. McConville, "Anthropometric in Sizing Design," Anthropometric Service Book (Vol. I): Anthropometry for Design. NASA Reference Publication 1024 (Lyndon B. Johnson Space Center, Texas: National Aeronautics and Space Administration, 1978), p. viii-6.

issue of military clothing and personal equipment."[16]

The sequence of steps in an anthropometric sizing survey, according to McConville et al. are the following:

1. Selection of an appropriate body of data for analysis.
2. Selection of the key or sizing dimensions.
3. Selection of intervals for the key dimensions (that is, the upper and lower limits of the key dimensions that will establish each size category).
4. Development of the dimensional data for each size of the established size categories.
5. Conversion of the summary statistical data to the appropriate design values.
6. Establishment of the tariff or numbers of each size necessary.[17]

These six steps form the guidelines for this study. Meeting the objective of each of the six steps will provide a firm foundation for this anthropometric sizing survey. The following parameters are used for describing each step:

Step 1. Selection of an appropriate body of data for analysis. The U.S. Navy selected a total of 4096 U.S. Navy recruits (men) from the

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[16]R.M. White and E. Churchill, The Body Size of the Soldier: U.S. Army Anthropometry. 1966 Technical Report 72-51-CE. (Natick, Mass.: U.S. Army Natick Laboratories, 1971), p. 5.

[17]John T. McConville, Ilse Tebbets,and Thomas Churchill, Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design, Technical Report 138 (Natick, Mass.: Navy Clothing and Textile Research Facility, 1979), p. 102.

Recruit Training Centers at Great Lakes, Illinois and San Diego, California (Appendix A) as the appropriate body of data for analysis in complying with the U.S. Armed Forces Anthropometric Survey of 1966.

Step 2. Selection of key or sizing dimensions. Although there were 70 anthropometric measurements taken in the survey, not all are useful in garment and pattern design. Some are useful in footwear and others for equipment design. This is based on discussions with Mr. Seymour Lash, Director, Clothing Development Division, Mr. Ben Di Fazio, Head Navy Designer, and Mr. Lou Baldisori, Head Patternmaker, Marine Corps. Their consensus varies slightly, so for this study the following key or sizing dimensions were selected:

a. Height (Stature)

b. Neck circumference

c. Chest circumference

d. Waist Circumference

e. Vertical trunk circumference

f. Sleeve length

g. Crotch height

These dimensions establish the garment size. In addition to the key dimensions, there are some primary dimensions which also have an impact on the pattern design and cut of the garment:

a. Weight

b. Hip circumference

c. Wrist circumference

d. Arm scye circumference

e. Waist height

f. Interscye distance

g. Cervical height

Step 3. Selection of intervals for key dimensions. Size variation for each dimension and all other associated design dimensions are correlated to the width of the size interval. An indication of the associated dimensions would be the neck, sleeve, chest, and waist dimensions of the medium size shirt, as an example.

The importance of this particular step, in the author's opinion, was highlighted by Alexander et al. in their statement:

> It is not only the body size variability that must be considered in establishing the sizing interval but factors such as the type of fit required, the material that will be used in fabrication, the cut and possibly the logistics of procurement and stocking of the final item. At some point, decisions will be made regarding the various trade-offs among the design consideration, and the sizing category intervals will be established. The major thrust of any such decision, of course, is to provide the best fit possible for the maximum number of users with the fewest number of sizes. Inevitably, there will be individuals within the design group who, because of extremes in body dimensions or unusual proportions, will not be satisfactorily fitted.[18]

Table 2 indicates the intervals this author selected for each key and primary dimension. This table also indicates which type of garment is covered by the key dimension: upper torso garment, lower torso-garment, or coverall-type garment.

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[18]Alexander et al., p.8.

In terms of generic category, height is currently broken down as shown in Table 3. Besides covering stature, it is industry practice to identify a generic body type of small, medium, large, etc. This term is used in sports garments, coveralls, and jump suits.

Table 2

Key and Primary Dimension Intervals

DIMENSION	Upper Torso	Lower Torso	Coverall	Note	Interval
Height	X	X	X	K	1"
Weight	X	X	X	P	10 lbs.
Neck circumference	X		X	K	1/2"
Chest circumference	X		X	K	1"
Waist circumference		X	X	K	1"
Hip circumference		X	X	P	1"
Vertical trunk circumference		X	K	2"	
Wrist circumference	X			P	1/2"
Arm Scye circumference	X		X	P	1/2"
Sleeve length	X		X	K	1"
Crotch height		X	X	K	1"
Waist height		X	X	P	1"
Interscye distance	X		X	P	1"
Cervical height	X		X	P	1"

Table 3

Current Generic Segmentation

Generic Segmentation	Range
Extra short	below 5'3"
Short	5'3" to 5'6"
Regular	5'6" to 5"10"
Long	5'10" to 6'3"
Extra long	6'3" and over

Step 4. Development of dimensional data for each size of the established size categories. The bivariate tables are used for this step. As an example, Table 4 is a bivariate table of "neck circumference and sleeve length," the parameters normally used for shirt sizing.

All the recruits in the sample who fall into the limits of a size category, such as neck size 15, are a subsample or subset. A median is calculated and selected as the central point of tendency, because of concern with the number of people falling above and below the point and not a dimension. The intent is, as indicated earlier, to assure a 90% coverage in the size tariff.

The individuals falling outside the size width parameters will be unable to be fitted in the standard sizes. Under the current system of outfitting recruits, a number of individuals do fall outside the size tariff. Within a size the number of ill-fitted recruits is large. Their uniform requirements are currently met by special order issue--the ordering of tailor-made articles of uniform. This requires excessive tailoring to obtain a reasonably good appearance.[19] In addition, the current system has no exact mean or standard deviation for size. It is basically in the designer's mind based on his or her years of experience. It is hoped that an anthropometric analysis step of developing the dimensional data for each size of the established size category will alleviate the above situations.

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[19]Cdr. R.A.J. Ranieri, Chief Naval Personnel Study Group on Outfitting of Recruits, May-October 1976.

TABLE 4

NECK CIRCUMF BY SLEEVE LENGTH
SLEEVE LENGTH

		27	29	30	31	32	33	34	35	36	37	38	39	40	TOTAL
N	12	1													1
E	12.5				2		1								3
C	13			1	5	2	5	3	3						19
K	13.5		1	3	16	17	20	21	7	4	2				91
	14		4	9	24	63	93	115	64	28	4	1			405
C	14.5		4	7	24	82	179	210	172	82	16	7			783
I	15			7	20	64	217	277	251	167	53	14	1		11072
H	15.5			3	7	38	110	220	244	174	61	19	6	1	891
C	16			2	3	14	65	102	115	111	49	22	3	1	487
U	16.5				2	5	16	41	61	56	31	16	5		233
M	17					1	4	9	10	32	10	6	2		82
F	17.5							2	3	4	7	3	2		21
	18					1		3		2	1	1			8
	TOTAL	1	9	32	103	207	710	1003	930	660	234	89	19	3	4096

Step 5. Conversion of summary statistical data to the appropriate design value. In this step a conversion of the summary statistical data to the appropriate design value is made. Alexander et al., defined design value as follows:

> The design value is a single numerical value for each variable that represents the actual body measurement for which a given end item will be designed .... The design value can be any combination of the mean plus or minus some increment of the within-a-size standard deviation.[20]

Prior to further the discussion on this step, some information on the normal distribution may prove helpful. As Alexander et al. stated, "for all practical purposes, anthropometric dimensions are normally distributed."[21] Figure 4 represents a 68-95-99, the rule for normal distribution as described by Moore.[22]

In viewing Figure 4, one can readily see that there are three standard deviations above and below the mean. The area under the curve covered by the first set of standard deviations equals 68% of the area, 34% above and 34% below. Two standard deviations equates to about 95% of the area and three standard deviations have 99.7% of the area under the curve.

The supply effectiveness goal of the Naval Supply System command had been established at 90% for clothing. Supply effectiveness is the measure or ratio of total requisitions filled as compared to total

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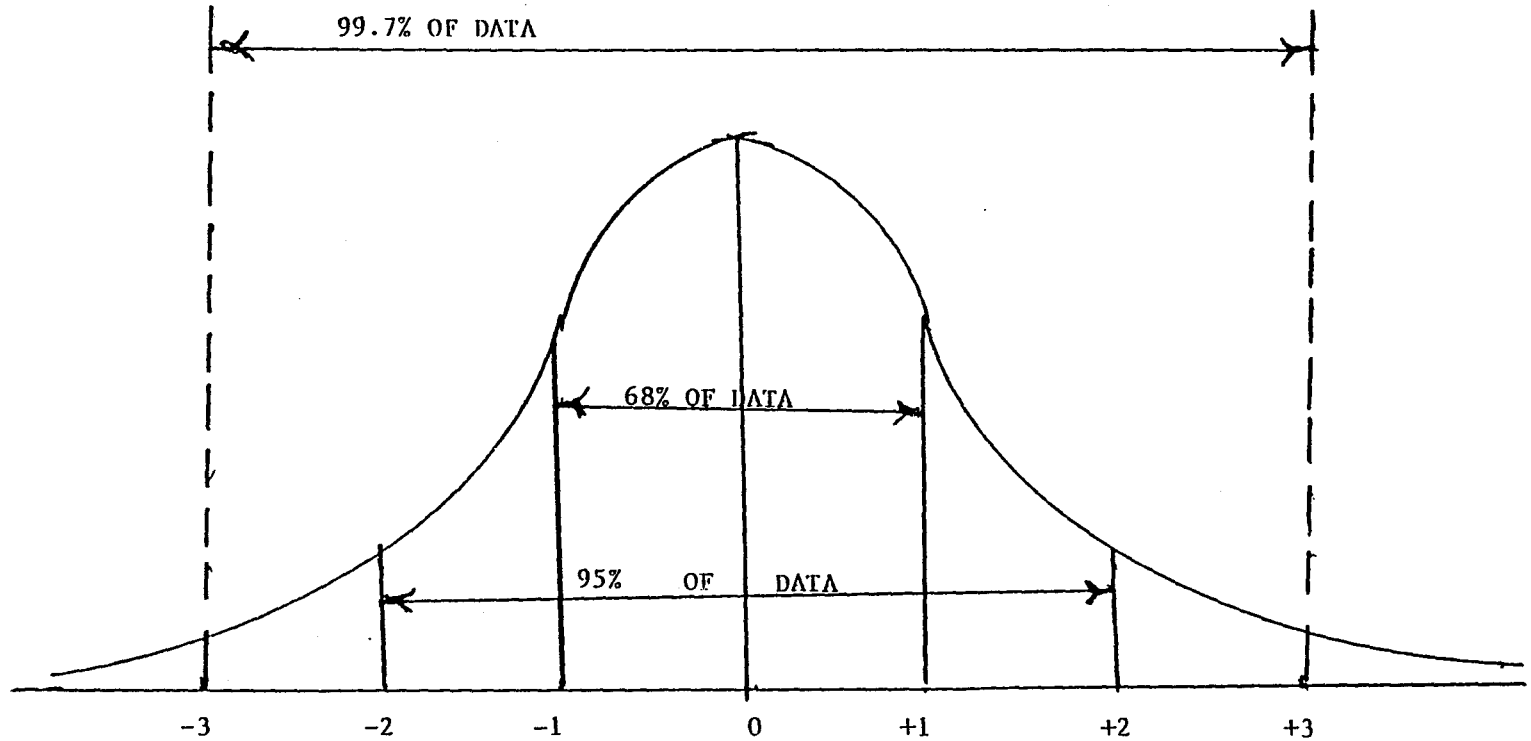
[20]Alexander et al., pp. 10, 11.

[21]Ibid.

[22]David S. Moore, Statistics, Concepts, and Controversies, (San Francisco: Freeman, 1979), p. 173.

FIGURE 4



THE 68 - 95 - 99.7% RULE FOR NORMAL DISTRIBUTION

requisitions submitted in a specific time frame. This deals in the range and depth of clothing inventory carried. The 90% as the design value equivalent to the mean, based on Figure 4, is plus or minus 1.65 standard deviations.

Coincidentally, Alexander et al. pointed out:

> To select the design values beyond these limits [90%] means increasing the range of adjustability that must be considered and may result in a poorer fit for the majority of users for the sake of accommodating the few persons with exceptionally high and low values for particular dimension or group of dimensions. An individual whose height and weight measurements would indicate a probable fit in a large-regular size but who has exceptionally long arms or legs, for example, may well be accommodated by the large-long size. In some cases custom-design will be necessary.
>
> It should be stressed that the design value is related to the body size of the population and should not be confused with actual garment and pattern measurements. To arrive at these values, seam allowances are added and, when necessary, varying increments to permit freedom of movement within the garment.[23]

Step 6. Establishment of the tariff or number of each size necessary. The final step in an anthropometric sizing survey is the establishment of the tariff or numbers of each size necessary. This initial tariff will help establish the number of individual articles of uniform which will be procured by size, and is based on the percentage of individuals in each size category. This proposed tariff will be in the concluding chapter of this study.

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[23]Alexander et al., p. 12.

Limitations

There are several limitations in this study. First, this study is based on the anthropometric measurements of the U.S. Navy male recruits who are younger than the total Naval population, slimmer, and therefore with a young adult body build. This study was excellent in application to recruit issue clothing, but has limited application to articles of uniforms for the older and more mature sailor.

The studies of Beatty and Gifford cover the diving personnel and the Navy pilots. Both groups represent the mature sailor and could be consolidated with this one to provide a rounded data base for use in revising the protective and work clothing for the sailor. Beatty's study was conducted on 100 U.S. Navy divers using some 54 anthropometric measures. The NASA publication stated of this study, "A comparison with anthropometric data for male aviation population indicates that the U.S. Navy diving population is significantly different from the general aviation population (heavier, shorter, smaller chest, etc.)."[24] Gifford's study on naval aviators had a population of 1549 personnel with 96 anthropometric measurements being taken.[25] The Gifford study, by providing the anthropometric measurements of a broad selection of the older and more mature sailor, should fit well with this present study which has a limiting factor in itself because of its youthful population.

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[24]NASA, Anthropometric Source Book, Volume III: Annotated Bibliography of Anthropometry, Reference Publication 1024 (Lyndon B. Johnson Space Center, Texas: National Aeronautics and Space Administration, 1978), p. 16.

[25]Ibid., p. 46.

Second, should this study suggest an increase in the number of generic lengths, this would be reflected as an automatic increase in inventory range. Associated with the increased inventory range would be ancillary costs of cataloging, inventory depth, warehouse space, and additional costs of training for personnel issuing uniforms.

Third, there is only selected application for use of the data to the clothing industry. This, again, is due to the young adult body measurements.

Fourth, the age of the study may be a limitation. The basic measurements were taken over 19 years ago. Following past trends, populations tend to becometaller and may have other body changes. It is this researcher's opinion that such changes will probably be minimal. The limitation, however, does exist.

Fifth, the application of these data to all navy recruits may be limited, since there has been a continuing growth in all the services of minority groups. The bone structure and body build of blacks, as an example, may not be sufficiently covered by this body of data.

Sixth, the implicit assumption that anthropometric measurements can systematically be applied to clothing dimensions may be subject to question.

Definitions

Due to the volume of terms used in this study, the definitions are listed in Appendix B.

CHAPTER II

REVIEW OF LITERATURE

History

It is generally assumed that the oldest and largest anthropometric study ever conducted is the O'Brien and Shelton Women's Measurement for Garment and Pattern Construction for the U.S. Department of Agriculture published in 1941. The results of this survey "... represent the most comprehensive clothing anthropometry of U.S. women ever undertaken."[1] This assumption, however, is not correct. Davenport and Love conducted an anthropometric study during World War I (WWI) on some 100,000 men. This latter survey covered 21 of the 54 dimensions covered by O'Brien and Shelton.[2]

Even this survey was not the oldest nor the largest. White pointed out that two anthropometric surveys were conducted during the Civil War era. One of these was based on over a million recruits, drafted men, substitutes, and enrolled men, and was published by Baxterin 1975. This is by far the largest study ever performed and the oldest collection of data, although unpublished until 1975. The second survey, accomplished

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[1]National Aironautical Space Administration. Anthropometric Source Book, Volume III, Annotated Bibliography of Anthropometry. Reference Publication 1024 (Lyndon B. Johnson Space Center, Texas: NASA, 1978), p. 88.

[2]Charles B. Davenport and A.G. Love, Army Anthropology, (Washington, D.C.: Government Printing Office, 1921).

during the Civil War era by B.A. Gould, was published in 1869.[3]

Anthropometric studies became popular between World War I and World War II. Several of these, like the O'Brien and Shelton study, involved the civilian population. During and after World War II, the military of several nations, including the United States, pursued anthropometric studies to improve the design of equipment and to improve the fit of clothing.

NASA Publications

NASA Reference Publication 1024, entitled, Anthropometric Source Book, consists of three volumes of what is believed by the author to be the most concise compilation of information and data pertaining to anthropometry. Volume I, entitled Anthropometry for Designers, consists of nine chapters covering basic anthropometry, three of which concern this author's area of interest: (1) "Anthropometry" by John T. McConville and Lloyd L. Laubach deals with measurement techniques and a sampling of 59 dimensions from several studies, both male and female; (2) "Anthropometry in Sizing and Design" by John T. McConville presents the six steps of the anthropometric sizing program described in Chapter I of this study. (Several of the references in this paper such as the U.S. Navy's Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design, Alexander et al's. Revised Height/

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[3]Robert M. White, An Annotated Bibliography of U.S. Army Anthropology (1947-1977), Technical Report Natick/TR-78/012, ADA060-939, (Natick, Mass.: U.S. Army Natick Research and Development Command, 1977), p. 6.

Weight Sizing Programs for Men's Protective Flight Garments, and Tebbetts' Height/Weight Sizing Programs for Women's Protective Garments, to name a few, use these steps in their sizing program.); (3) "Statistical Considerations in Man-Machine Design" by Edmund Churchill is a short course in statistics.

A segment of this third article which has an impact on this paper deals with percentile, and provides an idea of the cost impact when the attempt is made to exceed the 90% goal. Table 5 is an extract of Churchill's "Cost of Accomodating Additional Percentages of a User-Population in Mid-Range Units." (Appendix C).[4] It is the cost of accomodating percentages of a user-population in mid-range units. Since this follows a normal distribution, the same type of unit cost increase occurs as one moves in the reverse direction from the 50th to the 1st percentile. In describing this table, Churchill stated,

> "... in Table 5 we have taken the difference between the 50th and the 51st percentiles as a 'mid-range design unit' and have tabulated, in terms of this unit, the increase in the width of a design which would be required in order that it cover an additional one percent of the population."[5]

As can be seen from Table 5, there is a gradual rise in cost up to about

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[4]Edmund Churchill, "Statistical Considerations in Man-Machine Design," in Anthropometric Source Book, Vol.I: Anthropomentry for Designers. Reference Publication 1024. (Lyndon B. Johnson Space Center, Texas: National Aeronautics and Space Administration, 1978), pp. ix-20.

[5]Ibid., pp. ix-19.

Table 5

Extract From Cost of Accommodating
Additional Pecentages
of a User Polulation in
Mid-Range Units

Population Percentages	Cost in Mid-Range Units
50th to 51st	1.00 units
60th to 61st	1.04 units
75th to 76th	1.27 units
85th to 86th	1.75 units
90th to 91th	2.36 units
95th to 96th	4.22 units

the 75th percentile at a rate of increase of approximately 0.1 unit cost per 10 percentile points. It commences a geometric progression from here increasing by 0.5-unit cost for the next 10 percentile points at 85 and almost a full one unit cost to achieve only five percentile points at 90 and so forth.

The above highlights the need to eliminate the extreme tails of the distribution. It is too costly to carry in a supply system garments for the very small or very large recruit. Their clothing items can be met through the Special Order System in the Navy. Individuals of odd shapes and sizes are measured by the RTC tailor who submits the measurement to the Defense Personnel Support Center to fabricate the item on a tailor-made basis.

Volume II, A Handbook of Anthropometric Data, contains a short text covering anthropometric surveys, definitions of various measurements, a reference index of the dimensions provided in the table, and, for the most part, a series of anthropometric tables. These tables Note that a size 30 jumper actually measures 33" across the chest.

provide a summary of some 61 military and civilian anthropometric surveys. The populations covered are from the U.S., Europe, and Asia, both male and female. It covers some 295 measured variables with illustrations.

Volume III, Annotated Bibliography of Anthropometry, contains information on 236 books, articles, papers, and anthropometric surveys covering men and women. This documentation is from over 25 countries. A large segment of the surveys involve pilots and flight personnel, both male and female. These studies are aimed mainly toward improving the design of the work environment to improve efficiency and comfort during work operations.

A number of the studies, including some concerning flight personnel, had the design and fit of clothing as their main objective. Probably the best known of these was the O'Brien and Shelton study for the Department of Agriculture. The purpose of this study was, to improve the fit of women's garments and pattern construction.[6]

Navy Publications

Of the Navy references, several are specifications for articles of male clothing. These were reviewed to determine the current range of generic sizes being utilized by the Navy. It is to be noted that the specifications cover garment measurements and not body measurements.

Table 6 is extracted from military specifications on the jumper.[6]

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[6]Ruth O'Brien and William C. Shelton, Women's Measurements for Garment and Pattern Construction. Miscellaneous Publication No. 454. (Washington, D.C.: U.S. Government Printing Office, 1941), p. 1.

[7]U.S. Navy, Military Specification, Jumper, Man's (Blue, Dress), (Natick, Mass.: U.S. Navy Clothing and Textile Research Facility, 1979), p. 18.

TABLE 6

Sizes and measurements

Size	Chest (A)	Body Length (B)					Sleeve Length (C)					Collar Depth (D)	Collar Width (E)	Cuff Width (F)
		XS	S	R	L	XL	XS	S	R	L	XL			
30	33	21 1/2	23	24 1/2	26 1/2	28 1/2	30	31 1/4	32 1/2	34	35 1/2	9 1/4	10 1/2	8 1/2
32	35	21 1/2	23	24 1/2	26 1/2	28 1/2	30 3/8	31 5/8	32 7/8	34 3/8	35 7/8	9 3/8	10 3/4	8 3/4
34	37	21 1/2	23	24 1/2	26 1/2	28 1/2	30 3/4	32	33 1/4	34 3/4	36 1/4	9 1/2	11	9
36	39	21 3/4	23 1/4	24 3/4	26 3/4	28 3/4	31 1/8	32 3/8	33 5/8	35 1/4	36 5/8	9 5/8	11 1/4	9 1/4
38	41	22	23 1/2	25	27	29	31 1/2	32 3/4	34	35 1/2	37	9 3/4	11 1/2	9 1/2
40	43	22 1/4	23 3/4	25 1/4	27 1/4	29 1/4	31 7/8	33 1/8	34 3/8	35 7/8	37 3/8	9 7/8	11 3/4	9 3/4
42	45	22 1/2	24	25 1/2	27 1/2	29 1/2	32 1/2	33 1/2	34 3/4	36 1/4	37 3/4	10	12	10
44	47	22 1/2	24	25 1/2	27 1/2	29 1/2	32 5/8	33 7/8	35 1/8	36 5/8	38 1/8	10 1/8	12 1/4	10 1/4
46	49		24 1/4	25 3/4	27 3/4	29 3/4		34 1/4	35 1/2	37	381/2	10 1/4	12 1/2	10 1/2
48	51		24 1/2	26	28	30		31 5/8	35 7/8	37 3/8	38 7/8	10 3/8	12 3/4	10 3/4
50	53		24 1/2	26	28	30		35	36 1/4	37 3/4	39 1/4	10 1/2	13	11
52	55		24 3/4	26 1/4	28 1/4	30 1/4		35 1/4	36 1/2	38	39 1/2	10 5/8	13 1/4	11 1/4
Tolerance	±1	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/4	±1/4	±1/4

The amount of ease built into a garment usually runs 2-3" across the chest. This size 30 jumper will fit a man who has a chest measurement of possibly 29" to 31". The size 32 jumper will generally fit a man with a chest size of 31" up to 33" (with each chest dimension there is a tolerance of ± 1" for the manufacturer.)

Specifications of other garments are similar. The major factor here is that the actual body measurements are, as can be seen in Table 6, vague areas that include part of the amount of ease built into the garment. It also includes decorative segments such as the collar.

A reference to a study on Navy Junior Reserve Officer Training Corps (NJROTC) Cadets had a population sampling of 2,037 students from 21 high schools around the continental United States.[8] The data were excluded for this study because it covered young boys of high school age and stature and covered only nine measurements.

Another Navy reference is Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design. This study was initiated by this researcher when assigned as Officer-in-Charge, Navy Clothing and Textile Research Facility (NCTRF).

This researcher also directed a male Navy recruit survey in 1977 that was conducted by Mr. Ben Di Fazio, then the supervisor of design and pattern section of Naval Clothing & Textile Reasearch Facility. The sample population consisted of 562 recruits at the Recruit Training Center at Great Lakes. There were 29 measurements taken of recruits in

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[8]U.S. Navy, Body Measurement Study of NJROTC Cadets. Technical Report No. 92 (Natick, Mass.: Navy Clothing and Textile Research Facility, 1971).

this study.[9] However, three problems arose in the attempt to utilize these data. First, the only two measuring devices used were a set of scales and a tailor's tape. No precise anthropometric measuring devices were used as in the 1966 study. Second, a degree of bias was introduced into the sample, in that any extra short, extra tall, or muscular-appearing recruits were included without random consideration. Third, recruits from only one RTC were considered. This in effect reduced the geographic population of consideration from one half to one third. In any case the 1977 data were lost and not recovered.

Review of other Literature

The objective of the well-known study of O'Brien and Shelton was identified as follows:

> This research project was undertaken in order to provide measurements which could be used for improving the fit of women's garments and patterns.[10]

The problem which highlighted the need for this study, suggested by this author earlier, was the fact that garments and patterns were being made on a trial-and-error basis without much regard for body measurements. This was because the measurements assumed to be correct were those that had been used in the industry for years.

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[9]Richard A.J. Ranieri, Ben Di Fazio, and Felix Metla, "Anthropometric Measurements on 562 Recruits at the Recruit Training Center, Great Lakes" (Natick, Mass.: Navy Clothing and Textile Research Facility, 1977). (Unpublished Report.)

[10]O'Brien and Shelton, p. 1.

Each supplier or fabricating house had its own concept of size and measurement. There was virtually no standardization. Garments were being returned to retailers and mail order houses in large quantities because of ill fit, one leg of the clothing system triangle.

Through O'Brien and Shelton's study the apparel industry was provided with valid body measurements. From this they could be more precise in their garments and patterns and thus more properly fit the customer.

In 1946, the Army undertook an anthropometric survey of 105,062 men of which over 96,000 were in the process of being separated. This survey, by Francis E. Randell, was conducted at six different separation centers. One phase of Randall's report coveried 8,864 Army women. According to White and Churchill, "This was the first extensive survey to be conducted primarily to provide body size data formilitary clothing sizing and tariffing; it included the measurements of both men and women."[11]

It was during this time that the importance of anthropometric measurements to garment and pattern construction began to be realized. The captive audience or sample population of the military made large studies feasible. Not only was clothing being considered, but also the work environment such as the cockpit of a plane or the driver space within a tank. For the first time anthropometric surveys

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[11]Robert M. White and Edmund Churchill, United States Marine Corps Anthropometry, Technical Report Natick/TR-78/021 (Natick, Mass.: Clothing, Equipment and Materials Engineering Laboratory, U.S. Army Research and Development Command, 1977), p. 11.

were being made for design purposes. This can readily be seen in the Annotated Bibliography of U.S. Army Anthroopology by White.[12]

The studies from 1946 until 1964 had special applications. Some were on a specific part of the body such as a foot or hand or the head. Others were made for a limited type occupation such as tank corps personnel or aviators. Other studies were made to cover specific anthropological groups such as the Royal Thai Armed Forces.[13]

In 1964, it was determined that a rather complete anthropometric survey should be made of the United States Armed Forces. This proposal had the backing of the Defense Supply Agency (DSA), one of whose functions was to clothe all military personnel. DSA felt such a study would assist in sizing, fit, tariff, and distribution of clothing and personal equipment.

This major project was initiated in August 1965 by the Air Force. Using a sampling of 2,632 recruits in basic training, some 158 body measurements were taken. The Army survey began in November 1965 and had a sampling consisting of 2,639 recruits in basic training, 3,429 infantry, 489 armored and 125 Army aviation personnel. There were 70 body measurements taken in this study. The Marine Corps sample consisted of 2,008 men. All these studies have been published using the

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[12]Robert M. White, An Annotated Bibliography of U.S. Army Anthropology (1947-1977), Technical Report Natick/TR-78/012 (Natick, Mass.: U.S. Army Research and Development Laboratories, 1977), p. 29.

[13]National Aironautical Space Administration, Anthropometric Source Book, Vol. II: A Handbook of Anthropometric Data, NASA Reference Publication 1024, (LBJ Space Center, Texas: NASA, 1978), p. 23.

same 70 body measurements, and is the first publication of the report.[14]

The Marine Corps study was published by White and Churchill in December 1977. Since Mr. White, who headed these projects, died in November 1980, the only key to the methodology, techniques, and data-processing information used by this author were extracted from United States Marine Corps Anthropometry. Although the report was published almost 12 years after the actual survey, White stated in his summary and conclusions:

> The Marine Corps anthropometric data should be of wide use and application in the design, sizing and human engineering of clothing, personal equipment, and other material intended for use by the United States Marine Corps.[15]

This reference lends additional support to the statement in Chapter I indicating that the 1966 data is acceptable.

The next anthropometric study of interest is an Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design. This study was initiated by the author while assigned as the Office-in-Charge, Navy Clothing and Textile Research Facility. The need for better fitting uniforms for female recruits was also noted by the Chief of Naval Personnel study group. There had been no anthropometric sizing survey of Navy women. The estimated cost of a modest survey was close to $150,000 in 1977. At this point the author concluded that by combining the Army and Air Force studies, three advantages could be gained. First, a report could be developed at less than one third the cost.

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[14] White and Churchill, United States Marine Corps Anthropometry, p. 13.

[15] Ibid., p. 293.

Second, time in training personnel to collect the data would be saved. Third, the women of the Navy come from the same population as those surveyed in the Army and Air Force. It was felt that combining the two studies would round off any bias.[16]

The Air Force women's survey was conducted in 1968 and had a sample population of 1,905 women. The median age of the sample was 23 years. It consisted of 91% white, 8% black and 1% other. There were 138 anthropometric measurements taken.

The Army survey, conducted in 1976-77, had a sample population of 1,331 women. The median age of this sample was also 23 and consisted of 75% white, 23% black, and 2% other. There were 142 anthropometric measurments taken.

In developing this analysis, Ms. Josephine Brucato, project leader, and Mr. Ben Di Fazio, Navy clothing designer, using over 50 years of combined experience determined that of all the measurements, only 49 were useful in the design and construction of women's clothing and patterns. This women's study was then limited to these selected measurements. Mr. Di Fazio pointed out there was too much information for the average pattern designer to use effectively. A number of the measurements taken in the studies are not used in the development of a garment or pattern.

It was from this analysis that the author noted McConville's

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[16]U.S. Navy, Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design, Technical Report No. 138 (Natick, Mass.: U.S. Navy Clothing and Textile Research Facility, 1979), pp. 7-9.

six anthropometric sizing steps,[17] which seem to have appeared more frequently in other body measurement studies from this time.

Tebbetts et al. developed a study on Height/Weight Sizing Programs for Women's Protective Garments using the 1968 survey of Air Force women, the same population used in the Navy women's study cited above. In this study Tebbetts et al., used the now popular six-step anthropometric sizing analysis. The main objective of the report was to provide a "... four-, six-, eight-, and twelve-size system designed to accomodate the USAF women's population as a whole.[18]

The conclusions of this study confirm what would normally be expected. The most cost-effective size system is in the four- and six-size range. If one is looking for a better fit, then the eight- and twelve-size system should be considered. Tebbetts makes the following point:

> Given the impetus toward the least number of sizes as a constant, the selection of an appropriate sizing system will depend largely on two factors: the need for a close fit, and the adjustability built into the garment.[19]

The information provided in this study did not attempt to dictate which sizing table was to be used. It indicated that these

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[17]U.S. Navy, Analysis of Body Size Measurements for U.S. Navy Women's Clothing and Pattern Design, Technical Report No. 138 (Natick, Mass.: U.S. Navy Clothing and Textile Research Facility, 1979), pp. 7-9.

[18]Ilse Tebbetts and John T. McConnville, and Milton Alexander, Height/Weight Sizing Programs for Women's Protective Garments (Wright-Patterson Air Force Base, Ohio: Aerospace Medical Research Laboratory, Air Force Sytems Command, 1979), p.4.

[19]Ibid., p. 117.

are to be used as tools for the designer and management. Management was to decide the precision of fit and funding allocation for procurement and inventory. The designer, using management's parameters, was to develop the appropriate garment and size range. As Tebbetts concluded:

> Selection of an appropriate sizing program, then, is based on the designer's understanding of how closely the end item must fit and, alternatively, how much leeway can be allowed without compromising the garments' protective capacity of the wearer's functioning. It will be based on his knowledge of the adjustability of the garment and the range of body sizes such adjustments will accommodate. And, finally, it will depend on a careful study of the sizing program itself with a discriminative eye to wear within-a-size variability for dimensions of importance.[20]

Alexander et al. developed a study which was published just prior to Tebbetts' entitled Revised Height/Weight Sizing Programs for Men's Protective Flight Garments.[21] It should be noted that Tebbetts, McConville and Alexander worked together on these and other studies. The objective, methodology, six-step anthropometric sizing analysis, and conclusions of both studies are the same. Only the sample population is different.

A study by McConville, Robinette, and White on An Investigation of Integrated Sizing for U.S. Army Men and Women, poses an interesting concept. Its real intent was to reduce inventory monies through consolidation in design of men and women's clothing. This concept was tried by the Navy with dungarees in the early 1950s. The Navy designer

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[20]Ibid., p. 118.

[21]Milton Alexander, John T. McConville, and Ilse Tebbetts, Revised Height/Weight Sizing Programs for Men's Protective Flight Garments (Wright-Patterson Air Force Base, Ohio: Aerospace Medical Research Laboratory, Air Force Systems Command, 1979), p. 109.

had to take into account the hip and waist measurement of the female. Since garments were designed in increasing proportions, the male putting on a correct size waist found that the hip segments ballooned. The fly drop built in for men was found to be uncomfortably long for the female. The garments were considered not "fit for issue" to females and became a forced issue to male recruits until the 1960s in order to exhaust inventory.[22]

Another example of uncomfortable fit occurred during a winter field exercise in Alaska. U.S. Army women were issued male Arctic clothing to participate in the exercise. The writers discussions with several of these women indicated they became exhausted more quickly than the male counterpart because they had to fight the ill-fitted clothing.[23]

A third experience of this writer dealt with a uniform accessory--the rating badge. This is simply a piece of cloth indicating the rank of the noncommissioned petty officer. With this simple item it was felt that in lieu of having separate men's rating badges and women's rating badges, one single one would suffice. The smaller females, wearing size 8 blouse and below found the badge occupied the whole sleeve of the short-sleeve blouse, making it ungainly. At sizes 6 or 5 the badges were longer than the sleeve.[24]

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[22]The writer was assigned as Field Liaison Officer to the Navy Clothing and Textile Office in Philadelphia, 1962-1965.

[23]Assigned to Alaskan Command in 1974.

[24]Assigned U.S. Navy Clothing and Textile Research Facility, 1975-1977.

On the opposite side of the scale the badge looked lost on the sleeve of a tall and muscular third class petty officer. The rating badge too required several changes to look proper on all body types.[25]

Based on the above, the author concluded that garments should be designed either for men or for women. An item such as a loose-fitting coverall may, with properly designed adjustability built in, function properly for both.

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[25]Ibid.

CHAPTER III

METHODOLOGY

The objectives of this study were twofold: first, to improve clothing and pattern design through the use of anthropometric data in order to fit more recruits; second, to make proposals for tariff improvement. This study is based on the data collected on U.S. Navy recruits in 1966.

U.S. Navy Anthropometric Survey, 1966

In planning and organizing for these studies, Mr. White, the Project Director of the Armed Forces Anthropometric Survey covering Army, Navy and Marine Corps, had a staff of Army enlisted personnel assigned to him. These personnel were organized into three teams, each with six measuring stations. In this manner personnel were trained and became proficient at anthropometric measurements under consideration. At each military installation visited, base personnel were assigned as data clerks and support functions.

The six measuring stations of each team were responsible for collecting specified demographic information and taking and recording 70 body measurements. The objective of such a high volume of measurements was "... for the efficient design and sizing of military clothing and personal equipment, as well as for basic human engineering information necessary in the design of military vechicles, aircraft, and other weapon systems.[1] Additional details of the procedure are in Appendix D.

The U.S. Navy survey was a part of the Armed Forces Anthropometric Surveys of 1966. During the survey, Navy recruits at the then two male recruit training centers, (RTC), at Great Lakes, Illinois and San Diego, California were surveyed. The total sample of 4,096 male recruits was nearly equally divided between the two RTCs.

Unlike the Army, Air Force, and Marine Corps studies, all Navy participants were recruits. The age of the recruits ranged from 17.25 to 33.25 years with the mean at 19.86. The standard deviation was 1.47.

This anthropometric survey with a 4,096 sample population and over 70 data elements per person generated a mass of measurement data. These data were translated by statistical analysis into summaries of values to assist in the solution of design and related problems. The statistical summaries presented here are based on the variables selected by the project leader of the original survey. The intention was to extract the simplest and most useful summaries from the voluminous amount of data from the survey.

The means, standard deviation, standard errors (SE [M] mean and SE [SD] standard deviation) and the percentiles are listed in both metric and English units. The coefficient of variation is not among the traditional statistical values.

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[1]Robert M. White and Edmund Churchill, United States Marine Corps Anthropometry. Technical Report Natick/TR-78-021 (Natick, Mass.: Clothing, Equipment and Materials Engineering Laboratory, U.S. Army Research and Development Command, 1977), p.17.

The coefficient of variation is defined as a "... restatement of the standard deviation as a percent of the mean."[2] This statistic is often designated by the letter V and the formula is:

$$V = \frac{SD}{\bar{X}} \quad 100\%$$

Where V = the coefficient of variation

SD = the standard deviation

$\bar{X}$ = the mean

Churchill indicated the importance of this statistic as "the importance of the coefficient of variation for body size data in that this statistic tends to have roughly the same value for anatomically similar measurements".[3] Examples of this statistic provided in the same reference are the following:

Anatomic Measurement	V Range
Weight	10 -15 %
Skinfold measurements	30 -50
Head measurements	2.5 -3.5
Height and long bone measurements	3.5- 5.0
Major circumference, breadth and depth	5 -10

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[2]Edmund Churchill, "Statistical Considerations in Man-Machine Design," Anthropometric Source Book, Vol.I: Anthropometry for Designer, Reference Publication 1024 (Lyndon B. Johnson Space Center, Texas: NASA, 1978), pp. ix-5.

[3]Ibid., pp. ix-11.

As can be seen from the above, the measurements related to major bone structure have smaller V values, and conversely, measurements not using a body landmark or an identifiable anthropometric measuring point, generally have larger V values.

With this information plus the techniques and statistical measurement identified in Appendix D, sufficient background has been developed to move into data analysis. In the next chapter, this author will review and analyze the tables developed from the data in the U.S. Navy Anthropometric Study of 1966.

CHAPTER IV

RESULTS

This paper deals with the actual body measurements upon which to build a pattern or garment with varying degrees of ease. It is up to the patternmaker and designer to add the freedom necessary for the fashion and fit of the uniform. It will be helpful to highlight the appendixes prior to covering results.

Appendix E contains tables of percentiles as well as a brief description of the particular anthropometric measurement. It also provides a summary of statistics for each measurement. Appendix F contains tables of intervals and frequencies. The numbering of the tables is in the following series: E-1, E-2, etc. for Appendix E and F-1, F-2, etc. for Appendix F. Tables E-1 and F-1 pertain to the same anthropometric measurement, weight, and E-2 and F-2, to stature, etc. In this manner all like anthropometric data are correlated. Appendix G is a series of bivariate frequency tables. The correlation coefficient r and the square of the correlation r^2 were calculated and show in the even tables of Appendix G. Only the r^2 will be discussed in this chapter.

Percentiles

The importance of percentiles has been covered in Chapter II. Appendix E provides the percentiles for each anthropometric measurement.

Intervals and Frequencies

Appendix F contains tables of intervals and frequencies. The intervals are based on the program written by Edmund Churchill for Mr.

Robert White, the project manager for the armed forces anthropometric study. Table F-1 is in kilograms and pounds and Table F-71, although it cites centimeters and inches, is actually years of age. All other tables are in centimeters and inches. It should be noted that the original measurements were in millimeters. It was then converted to centimeters with intervals varying from one-half to several centimeters depending on the particular anthropometric measurement. The frequence segment, in effect, is a histogram of the distribution of the sample population. The two segments point out the largest and smallest dimension of each anthropometric measurement.

In viewing Table E-71, one finds the mean of recruit age as 19.86 years old with a standard deviation of 1.47 years. Table F-71 provides a histogram and also indicates the lower age group between 17.25 years and 18.24 years and had a population of 241 recruits. This would indicate that recruits aged below the mean can be covered within two standard deviations. On the other hand, the oldest recruit was between 32.25 and 33.24 years of age. The data on racial mix is coded in the program. The key to this code was lost with the passing of Mr. Robert White.

Generic Size Evaluation

The usefulness to clothing and pattern design can be seen by the generic size evaluation shown in Table 7. As defined in Appendix B, generic size relates to the descriptive terms of short, regular, long, etc. when pertaining to stature, as in the coat or trouser length, or as small, medium, large, etc. when pertaining to a body type, as in

coveralls. The generic size here applies to a height or stature dimension. The range of stature in this study is shown in Table F-2 and the mean and standard deviation in E-2.

Line A of Table 7 is the generic to stature dimensions in the Voluntary Product Standards PS 45-71.[1] Line B of Table 7 is the generic to stature dimensions of the U.S. Navy Uniform Fitting Techniques.[2]

The Halper Publishing Company published a booklet in which was highlighted a catalog of made-to-order measurements of garments based on heights of 5'4", 5'6", 5'8", 5'10", 6', and 6'2".[3] Since these did not list generic sizes the data were left out of Table 7.

Line P of Table 7 is the author's proposed generic to stature dimensions. Based on this author's experiences, tailors outfitting recruits round off the stature to the nearest one-half inch. The stature measurements in the Voluntary Product Standards are in the whole and the one-half inch measurements too.

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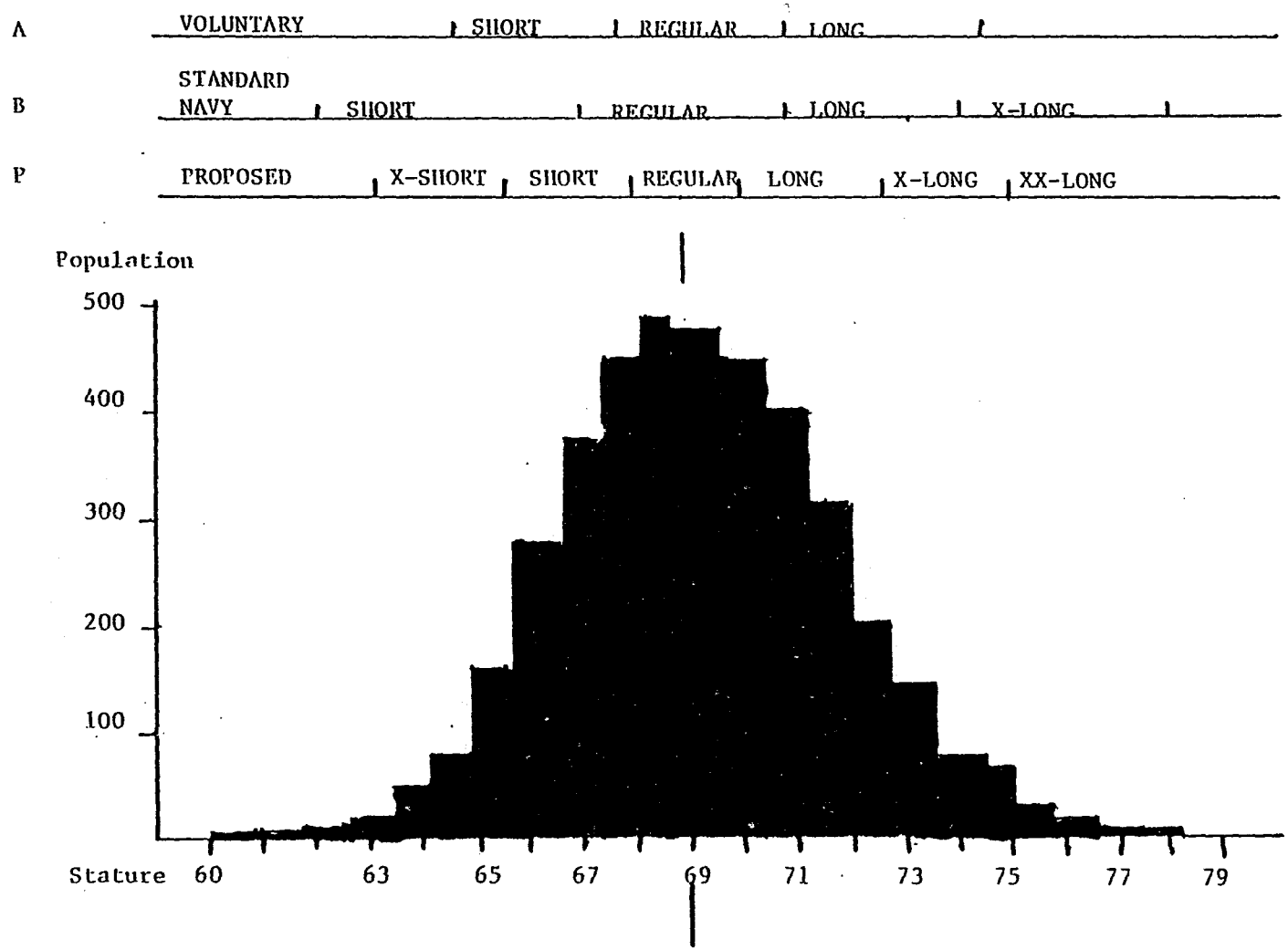
[1]U.S. Department of Commerce, Body Measurements for the Sizing of Apparel for Young Men (Students) (Washington, D.C.: Government Printing Office, 1971), pp. 2-4

[2]U.S. Navy, U.S. Navy Uniform Fitting Techniques (Natick, Mass.: Navy Clothing and Textile Research Facility), p.5. (Pamphlet.)

[3]Halper Publishing Company, "Updated Measurement Chart of Tabulations to Assist the Tailor in Checking Customers' Measurements and Proportions," in Made to Measure (Chicago, Ill.: Author, 1982), pp.142-143.

Table 7

Generic Size Evaluation



In order to provide a more statistically sound approach to grading, the mean and standard deviation were selected to define generic sizes for both stature and body type. Using the standard deviation eliminated the guess work that appeared prevalent in the author's experience.

Table E-2 indicates the mean of the stature is 69.03 inches with a standard deviation of 2.57 inches. From a practical point of view these are rounded to 69 and 2.5 inches, respectively. In establishing the mid-range about the mean or the regular size, a plus and minus one standard deviation would encompass too great a region, some five inches. In this, it would have been difficult to fit the lower and upper segments of a regular size. For this reason, the author chose a range of one inch on either side of the mean to denote regular. A full standard deviation would have come to one and one-quarter inches, again not practical in the author's opinion. This choice should also improve the fit of garments over the range of individual; then, in grading both up and down one standard deviation or 2.5 inches was used. This, then appears to equitably cover the range of anthropometric measurements of stature. Again, stature is the basis for this generic size. As can be seen by the histogram in Table 7, the distribution is more even and adapted to the median than the other systems.

Based on the above, Table 8 represents the proposed generic size range. Utilizing Table 8 as a guide, the range for the various articles of uniform can now be generated. This will be accomplished through the use of bivariate frequency tables in Appendix G.

Table 8

Proposed Generic Size Range

Generic Size	Range (In Inches)	% of Population
XX-short	62.9 and below	0.8
X-short	63 - 65.49	7.9
Short	65.5 - 67.9	27.4
Regular	68 - 69.9	29.5
Long	70 - 72.49	25.2
X-long	72.5 - 74.9	8.5
XX-long	75 and above	0.7

Before beginning, it should be noted that the dimensions in the various tables and appendices relate to anthropometric measurements which are exact measurements. They do not include ease built into garments nor the ease included when a tailor takes a tape measure. As an example, a tailor would normally have one or two fingers within the tape circumference when measuring the neck size.

Coat

Appendix G (Table G-1) is the bivariate frequency table for stature and chest circumference. The statistical data pertaining to this frequency are in Table G-2. It should be noted that in Appendix G the odd tables are bivariate frequency tables and the even tables are the associated statistical data. Superimposed on Table G-1 is the range of generic sizes as reflected in Table 8.

Table 9 is the coat size schedule. It indicates the anthropometric chest measurement to the generic size indicating the sample size of the population falling within that dimension as a percentage of the total population this represents. This was arrived at by finding the median for each line of Table G-1, then taking 90% of the population for that size and dropping off the tails. The median was chosen so as to arrive at the center of the line and cover the middle 90% of that line. It is to be noted that in this manner the sizes selected will assure fitting 90% of the population against the stated goal of 90%.

This procedure was used in the development of all the proposed garments charts. Table 9 indicates the recommended coat sizes to be carried in each generic.

As stated earlier, Appendix G (Table G-2) provides statistical data pertaining to the stature versus chest circumference frequency in Table G-1. In this the coefficient of correlation indicates a .26103 association between the variables. The r^2 of 6.8% is the percentage of variation in stature that can be explained by its association with the chest circumferences variable. From Appendix D we note that it is a measure of strength of the association. This value of r^2 is significant at the 99.999 confidence level based on the regression F test and the t test. There is a very high degree of confidence that the rather low r^2 value is, nevertheless, significant.

Referring to Table 9, one notes the XX-short size is not included. This was done for two reasons. First, the segment of the total population is small and falls out on a tail end of the skew. Second, an X-short can be tailored down to fit an XX-short (0.2% of the sample population). On the other side of the size range, there is insufficient seam and hem cloth available in an X-long to let it out sufficiently to cover an XX-long. By utilizing the lowest size available, e.g., 32 X-short and tailoring the garment down, another 1.5% of the population can be accommodated.

The coat sizes presently available are prescribed in the Navy specification cover from 33 to 48 in the generic sizes short, regular,

Table 9

Proposed Coat Size Schedule:

Percentage of Total Sample Population

Chest Circum-ference	Generic Size					
	X-Short	Short	Regular	Long	X-Long	XX-Long
32	.3					
33	.5	1.5				
34	.5	2.7	2.7	2.0	.8	
35	.5	3.0	4.3	3.9	1.1	.4
36	.4	2.6	5.0	5.2	1.9	.4
37	.4	2.5	4.4	5.1	2.3	.5
38	.3	1.8	3.9	4.6	2.1	.4
39		1.2	2.5	3.8	1.9	.4
40		1.0	1.7	2.5	1.2	.3
41			1.2	1.6	1.0	
42				1.1	.6	
Total %	2.9	16.3	25.7	29.8	12.9	2.4

long and X-long. Table 10 reflects the measurements of certain segments for the coat.[4] The 47 proposed sizes of Table 9, which will provide a 90% coverage, is far less than the 64 sizes of Table 10.

Table 10 presents a series of 1/8" changes in coat length but a continuous measurement for sleeve length in the size direction. In the generic size the difference is 1 1/4" from short to regular, then 1 1/2" to long and 1 1/4" to X-long in coat length and a one inch increase for sleeve length.

Earlier in this paper it was pointed out that not all anthropometric measurements were useful to the tailor or patternmaker and that some useful measurements have no anthropometric measuring points. The coat length is an example of the latter. There are several other measurements which can enhance the cut of the coat. These are reflected in Table 12.

From the discussion on bivariate tables, it is known that length-to-length dimensions and circumference to circumference dimensions have by far the best square of the coefficient of correlation r^2. This provides an indication of association and proportionality. Appendix Table G-3 is the bivariate for stature versus sleeve length and G-4 is the applicable statistical data. Table G-4 indicates an r^2 value of 44.9%. Again the F and t tests show a high correlation.

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[4]U.S. Navy, Military Specification Coat, Man's, Wool, Winter (Natick, Mass.: U.S. Navy Clothing and Textile Research Facility, 1974), p. 44.

Table 10

Measurement of Coat

Sizes	(A)	Coat length (B)				Sleeve length (C)			
	Chest	Short	Regular	Long	X-long	Short	Regular	Long	X-long
33	36	27-5/8	29-1/8	30-5/8	32-1/8	16	17	18	19
34	37	27-3/4	29-1/4	30-3/4	32-1/4	16	17	18	19
35	38	27-7/8	29-3/8	30-7/8	32-3/8	16	17	18	19
36	39	28	29-1/2	31	32-1/2	16	17	18	19
37	40	28-1/8	29-5/8	31-1/8	32-5/8	16	17	18	19
38	41	28-1/4	29-3/4	31-1/4	32-3/4	16	17	18	19
39	42	28-3/8	29-7/8	31-3/8	32-7/8	16	17	18	19
40	43	28-1/2	30	31-1/2	33	16	17	18	19
41	44	28-5/8	30-1/8	31-5/8	33-1/8	16	17	18	19
42	45	28-3/4	30-1/4	31-3/4	33-1/4	16	17	18	19
43	46	28-7/8	30-3/8	31-7/8	33-3/8	16	17	18	19
44	47	29	30-1/2	32	33-1/2	16	17	18	19
45	48	29-1/8	30-5/8	32-1/8	33-5/8	16	17	18	19
46	49	29-1/4	30-3/4	32-1/4	33-3/4	16	17	18	19
47	50	29-3/8	30-7/8	32-3/8	33-7/8	16	17	18	19
48	51	29-1/2	31	32-1/2	34	16	17	18	19
Tolerance	± 1	± 1/2	± 1/2	± 1/2	± 1/2	± 1/2	± 1/2	± 1/2	± 1/2

NOTE: Chest, waist, and length of coat measurements shall be taken with coat fully buttoned, placed smooth and flat.

A. Chest - Twice the measurement taken across front at the base of armholes from folded edge to folded edge.

B. Coat length - Measurement taken from the base of undercollar (seam), down center back to bottom of coat.

C. Sleeve length - Measurement taken from the base of armhole, along inseam to bottom of sleeve.

3.9 Workmanship.- The finished coats shall conform to the quality of product established by this specification. As a final step in the supplier's production control plan before formation of a lot, each dress coat shall be examined after pressing and prior to folding for packaging, and a coat containing a selected defect shall not be included in the end item lot. Selected defects are those defects listed in MIL-STD-1490 indicated by an asterisk (*). The occurrence of defects shall not exceed the applicable acceptable point value or defect limit.

The sleeve length of the various coat sizes must be sufficiently long to cover the maximum population. At the same time it must not give a distorted appearance to personnel in the lower segment of the population. The dimensions of Table 8 were applied to Appendix G-3. For each generic a median was selected and then a population of 90% about this median. At the upper value of the 90% the sleeve length was identified. As an example, in the X-short range the population was 139 with a median of 70. The 90% level would encompass a population of 125 with roughly seven falling out of the high and low limits. Counting down seven from the topmost population indicates the 34 sleeve length should apply to the X-short generic size. This procedure will be utilized in all supporting tables. Based on this concept, Table 11 was established for suggested body sleeve lengths.

Table 11

Proposed Coat Sleeve Lengths

Size	Sleeve Length (inches)
X-Short	34
Short	35
Regular	36
Long	37
X-Long	38
XX-Long	39

NOTE: Sleeve length is measured as indicated in Appendix Table E 61.

There are several secondary measurements of circumference which can improve the design of the coat. Table 12 provides the various body circumference dimensions associated with chest circumference which are useful in the design of the coat and the jumper. Appendix Table G-5 provided the guidelines for waist circumference as compared to chest circumference. Again, the 90% factor described earlier was used in arriving at the dimensions in Table 12. Here too, we find a high coefficient correlation (in Table G-6) and an $\underline{r^2}$ of 65.3%.

Appendix Table G-7 provides the bivariate for chest and arm circumference. From Appendix Table G-8 we find the high $\underline{r^2}$ of 51.4%. Hip circumference is compared to the chest circumference variable in Appendix Table G-9. Here again, the $\underline{r^2}$ is 64.4%. The last dimension to constitute Table 12 is the interscye distance versus chest circumference. Although this is not a circumference dimension, it is an important measurement in the garment, and it is a segment of the circumference measurement. Appendix Table G-11 is the bivariate, and G-12 provides the statistical data indicating an $\underline{r^2}$ of 31.6%. As stated above, Table 12 measurements are also applicable for the next article of uniform, the jumper.

Table 12

Various Body Circumference Dimensions for Men's

Proposed Coat and Jumper Construction

Chest Circumference	Hip Circumference	Arm Circumference	Interscye Dist.	Waist Circumference
32	35	17	15	29
33	36	17.5	16	30
34	37	18	16	31
35	37	18.5	17	32
36	38	18.5	17	33
37	39	19	17	34
38	40	19	18	35
39	41	19.5	18	37
40	42	20	18	38
41	43	20.5	19	40
42	43	20.5	19	40
43	44	21	19	41

Jumper

Table 13 provides the sizes and measurements of the U.S. Navy jumper.[5] The determination of fit is based on the generic consisting of chest size and stature, secondary measurements of importance to a proper fit are body length, sleeve length, and wrist width, which applies to wrist circumference. It should be noted that these all refer to a garment piece measurement.

The body length here is not considered an anthropometric measurement. According to Mr. Seymour Lash it is "a point that the bottom of the jumper reaches when it covers the second button down from the top on the 13-button trouser."[6]

In establishing the size of the jumper for a recruit, the major measurements for sizing are stature and chest circumference. For this reason the size range of the coat, Table 9, is applicable for the jumper. Other supporting measurements for proper fit are in following tables.

In viewing Table 13, which is a copy of the specification, under the sleeve length columns, there is an increase of three-eighths inch as each size increases with a manufacturing tolerance of one-half inch. At the same time, there is an increase in the length of one and one-fourth inch moving from X-short to short to regular. However, the dimension

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[5]U.S. Navy, Military Specification Jumper, Man's (Blue Dress) (Natick, Mass.: U.S. Navy Clothing and Textile Research Facility, 1979), p. 1.

[6]Ibid. (Discussions with Mr. Seymour Lash).

TABLE 13

Existing Jumper Sizes and Measurements

Size	Chest (A)	Body Length (B)					Sleeve Length (C)					Collar Depth (D)	Collar Width (E)	Cuff Width (F)
		XS	S	R	L	XL	XS	S	R	L	XL			
30	33	21 1/2	23	24 1/2	26 1/2	28 1/2	30	31 1/4	32 1/2	34	35 1/2	9 1/4	10 1/2	8 1/2
32	35	21 1/2	23	24 1/2	26 1/2	28 1/2	30 3/8	31 5/8	32 7/8	34 3/8	35 7/8	9 3/8	10 3/4	8 3/4
34	37	21 1/2	23	24 1/2	26 1/2	28 1/2	30 3/4	32	33 1/4	34 3/4	36 1/4	9 1/2	11	9
36	39	21 3/4	23 1/4	24 3/4	26 3/4	28 3/4	31 1/8	32 3/8	33 5/8	35 1/4	36 5/8	9 5/8	11 1/4	9 1/4
38	41	22	23 1/2	25	27	29	31 1/2	32 3/4	34	35 1/2	37	9 3/4	11 1/2	9 1/2
40	43	22 1/4	23 3/4	25 1/4	27 1/4	29 1/4	31 7/8	33 1/8	34 3/8	35 7/8	37 3/8	9 7/8	11 3/4	9 3/4
42	45	22 1/2	24	25 1/2	27 1/2	29 1/2	32 1/2	33 1/2	34 3/4	36 1/4	37 3/4	10	12	10
44	47	22 1/2	24	25 1/2	27 1/2	29 1/2	32 5/8	33 7/8	35 1/8	36 5/8	38 1/8	10 1/8	12 1/4	10 1/4
46	49		24 1/4	25 3/4	27 3/4	29 3/4		34 1/4	35 1/2	37	381/2	10 1/4	12 1/2	10 1/2
48	51		24 1/2	26	28	30		31 5/8	35 7/8	37 3/8	38 7/8	10 3/8	12 3/4	10 3/4
50	53		24 1/2	26	28	30		35	36 1/4	37 3/4	39 1/4	10 1/2	13	11
52	55		24 3/4	26 1/4	28 1/4	30 1/4		35 1/4	36 1/2	38	39 1/2	10 5/8	13 1/4	11 1/4
Tolerance	±1	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/2	±1/4	±1/4	±1/4

increases by one and one-half inch moving from the regular to long and then to X-long. This type of increase was determined by past concepts as pointed out in an earlier chapter. Again, referring to Appendix G, Table G-3 is the bivariate table for stature versus sleeve length, and Table G-4 the statistical chart, has an r^2 of 44.9%. A sleeve length to chest circumference does not carry a high r^2 value.

Table G-3 reveals that the median shift in sleeve length is approximately one inch for each generic size. Since the jumper is considered a dress uniform or parade uniform, the fit and appearance of the sleeve are crucial. Table 9 which provides the garment size of the coat is also suggested for the jumper coupled with the sleeve length array of Table 14. This table provides the suggested sleeve length to go with the jumper size as a percentage of the total population. This should provide an excellent sleeve length fit over 95.0% of the sample population.

Bivariate Table G-13 displays the two variables of chest circumference versus sleeve length. This array would match to the chest circumference, but cannot be adequately tied to stature and generic sizing.

The skipping of sizes, as in Table 13, does not assure a better fitting garment. The inconsistency of sizing can be seen when the coat schedule, Table 10, is compared to the jumper schedule, Table 13. These are for the same population. The proposed schedule, Table 9, in the author's opinion, clears up a degree of confusion which currently exists.

Table 13A is a comparison of some proposed dimensions to Table 13. It should be noted the body length in Table 13 is at a point where it would cover the second button on 13 button trousers. This is not an anthropometric measurement. The collar size in Table 13 is also not an anthropometric measurement, but the dimension of a fashion item on the jumper.

In establishing sleeve lengths Table 14 along with Table 9 was used. An example of the matching process was to identify the fact that Table 14 only had four sleeve dimensions for X-short. The range of generic X-short from Table 9 was 32, 33, 34, 35, 36, 37 and 38. By assigning the first sleeve length to 32 X-short, one can be assured of increasing the range of better fit area. Then the sleeve lengths were proportioned to cover a minimum of 2 generic sizes in the X-short category. Based on the author's experience, this was a more practical approach.

As mentioned earlier and pointed out in Table 13, the wrist dimension plays an important part in the blousing appearance of the jumper. Appendix G (Table G-15) is the bivariate table for sleeve length versus wrist circumference. From this Table 15 was drafted. As with the earlier tables on supporting sizes, a 90% level around the median was established and the largest dimension chosen.

Again, Table 13 is in a garment dimension which includes "ease" and fashion. Table 15 is based simply on anthropometric measures.

The dimensions of circumference used in the pattern development of the coat are also used in the jumper. For this reason, the data in Table 12 are also applicable here for the jumper.

Table 13A

A Comparison of Some Proposed Jumper Dimensions

Chest Circum	Sleeve Length XS	X	R	L	XL	XXL	HIP CIRC	ARM CIRC	INTER DIST	WAIST CIRC
32	31						35	17	15	29
33	32	31					36	17.5	16	30
34	32	32	32	33	34		37	18	16	31
35	33	32	33	34	35	36	37	18.5	17	32
36	33	33	33	34	35	37	39	18.5	17	33
37	34	33	34	35	36	37	39	19	17	34
38	34	34	34	35	36	38	40	19	18	35
39		34	35	36	37	38	41	19.5	18	37
40		35	35	36	37	38	42	20	18	38
41			36	37	38		43	20.5	19	40
42				37	38		43	20.5	19	40
43							44	21	19	41

Table 14

Generic to Sleeve Length Dimension for Jumper as

A Percentage of Total Sample Population

	Sleeve Length							
Generic	31	32	33	34	35	36	37	38
X-short	0.7	1.0	0.8	0.3				
Short	1.2	3.4	6.3	4.6	1.8			
Regular		2.0	6.6	10.2	6.6	2.3		
Long			3.4	7.6	11.2	7.5	1.8	
X-long				1.7	2.9	5.2	2.6	1.1
XX-long						0.7	0.9	0.8
Total %	1.9	6.4	17.1	24.1	22.5	15.7	5.3	1.9

Table 15

Proposed Wrist Circumference to Sleeve Length for the Jumper

Sleeve Length	Wrist Circumference[a]
31	6.5
32	6.75
33	7.0
34	7.0
35	7.0
36	7.25
37	7.25
38	7.25
39	7.25

[a]Inches

Trousers

Currently the Navy uses several styles and cuts of trousers. Among these are a tan Type I, a khaki Type II, a dungaree and a blue dress trouser, normally referred to as the "13 button" or as the "bell bottom" trouser. Again, this paper provides anthropometric measurements upon which patterns for the various garments are designed. For purposes of brevity, correlation wills be made to the enlisted men's blue dress trousers. Table 16 is the length and waist dimensions of blue dress trousers available in the Navy Supply System.[7]

[7]U.S. Navy, U.S. Navy Uniform Fitting Techniques (Natick, Mass.: Navy Clothing and Textile Research Facility), p.7.

Table 16

U. S. Navy Blue Dress Trouser Sizes

Length	Waist Sizes												
X-short	26	27	28	29	30	31	32	33	34	35	36	37	38
Short	26	27	28	29	30	31	32	33	34	35	36	37	38
(5'2" to 5'6")	39	40	41	42	43	44	45	46	48	50			
Regular	23	24	25	26	27	28	29	30	31	32	33	34	35
(5'7" to 5'10")	36	37	38	39	40	41	42	43	44	45	46	48	50
Long	24	25	26	27	28	29	30	31	32	33	34	35	36
(5'11" to 6'1")	37	38	39	40	41	42	43	44	45	46	48	50	
X-long	26	27	28	29	30	31	32	33	34	35	36	37	38
(6'2" up)	39	40	41	42	43	44	45	46	48	50			

Appendix G (Table G-17) is the bivariate tables comparing stature to waist circumference. It depicts the array of sample population using these two variables. In comparing Appendix Table G-17 to the above Table 16 it becomes apparent to the author that several of the sizes carried in the Navy Supply System do not appear to have any demand in the sample.

In comparing the 110 sizes of Table 16 to the 51 sizes in the proposed Table 17 one has a 54% savings and still meets 90% of the demand. As one considers the ability to cover the next generic size down with added tailoring, the percentage increases another 3%.

Utilizing Appendix Table G-17, a more accurate size range is presented in Table 17.

Table 17

Proposed Waist Circumference to Generic Size For

Trousers as a Percentage of Total Sample Population

Waist Circum-ference	Generic Size					
	X-Short	Short	Regular	Long	X-Long	XX-Long
27		0.8	0.8			
28		1.8	1.8	1.4		
29	0.7	2.7	3.8	3.0	0.9	
30	0.5	3.0	5.2	4.3	1.3	
31		2.6	4.3	5.0	2.1	0.4
32		2.0	3.0	4.7	1.9	0.4
33		1.5	2.7	3.4	1.7	0.5
34		1.1	2.0	2.5	1.2	0.3
35		0.5	1.4	2.0	1.0	0.4
36		0.5	1.4	1.6	0.9	
37			0.5	1.3	0.7	
38			0.5	0.9	0.6	
39				0.8		
% of Total Sample Population	1.2	16.5	27.4	30.9	12.3	2.0

Table 17 depicts the waist circumference to generic size for trousers as a percentage of total sample population. It was developed to be similar to previous tables, in that the median was established and then 90% of the population surrounding the median was determined. The sizes depicted represent approximately 90.3% of the sample population against the stated goal of 90%. Two waist circumferences were added on the lower range because of the high percentage of the sample population (1.2%) that they represent.

The concept of trading off the XX-short for XX-long is also used here on the trouser. The volume of population one can cover with the X-short by shortening the trouser is greater and easier than attempting to "let out" an X-long to fit an XX-long.

It was felt by this author that key dimensions of circumference to circumference and length-to-length required in the pattern development of trousers should also be addressed. Table 18 covers body curvature dimensions. It was developed from the bivariate Tables G-19, waist circumference by hip circumference; G-21, waist circumference versus upper thigh circumference; and G-23, waist circumference by fly drop. The fly drop is not a true anthropometric measurement. It is derived by subtracting the crotch height from the waist height. In tailoring this segment of the garment a degree of curvature is added, and this is why it is the curvature table rather than the length table. Again, the statistical data is reflected in Tables 20, 22 and 24.

Table 19 adds body length dimensions needed in the pattern development of the trouser. Here, Appendix Table G-25, stature versus knee height, and G-27, stature versus crotch height, are added.

Table 18

Various Body Curvature Dimensions

Proposed for Trouser Construction

Waist Circumference	Hip Circumference	Fly Drop	Upper Thigh Circumference
27	35	13.5	21
28	36	13	21
29	37	13	22
30	37	13	22
31	38	13	23
32	39	13	24
33	40	13.5	24
34	41	13.5	25
35	41	13	26
36	42	13.5	26
37	43	13	27
38	43	13	27
39	43	13	27
40	44	13.5	27

Table 19

Various Body Length Dimensions for

Proposed Trouser Construction

Trouser	Crotch Height	Knee Height
X-short 63 - 65.49	32	21.5
Short 65.5 - 67.9	33	22.0
Regular 68 - 69.9	34	22.5
Long 70 - 72.49	35	23
X-long 72.5 - 74.9	37	24
XX-long 75 and above	38	25

The statistical data are in Appendix Tables G-26 and G-28, respectively. Note again in these tables the high coefficient of correlation with the equally high r^2 value.

Shirt, Long Sleeve

Table 20 is the listing of sizes for long sleeve shirts utilized by the U.S. Navy.[8] It represents the range of items carried in the Navy Supply System.

[8]Ibid., p. 4.

Table 20

Current Listing of Sizes of Long Sleeve Shirts

Neck Size	Sleeve Length										
12	27	28	29	30	31	32	33				
12½	27	28	29	30	31	32	33				
13	27	28	29	30	31	32	33				
13½	27	28	29	30	31	32	33	34	35		
14	27	28	29	30	31	32	33	34	35		
14½		28	29	30	31	32	33	34	35	36	37
15				30	31	32	33	34	35	36	37	38
15½				30	31	32	33	34	35	36	37	38
16					31	32	33	34	35	36	37
16½					31	32	33	34	35	36	37
17						32	33	34	35	36	37
17½						32	33	34	35	36	37
18						32	33	34	35	36	

The Appendix Table G-29 is the bivariate table correlating the variables of neck circumference to sleeve length. Again, one notes representation of the sizes in the sample population, Table G-30 indicates an r^2 value of .14398. Considering that one variable is a length and the other a circumference, this is a relatively high relationship. Here again, the significance of the F and t tests are extremely high.

In sizing a dress shirt, a key dimension is neck circumference. Since this garment is long sleeved, the next key or critical measurement would be either the sleeve length or the sleeve inseam. Appendix G (Table G-31) is the bivariate table for neck circumference to sleeve inseam. Note its distribution is more widely scattered than G-29. This is born out by Appendix G (Table G-32) which indicates these variables have an r^2 value of only .0195, which is not significant, as compared to the sleeve length .14398 value. This lends credence to the use of the sleeve length as a prime variable in shirt sizing.

Based on Appendix G (Table G-29) and using the rationale of at least a 90% fit, Table 21 is the proposed long sleeve shirt size range. This tabulates to fitting 90.4% of the recruit population.

It should be noted that Table 20 has some 98 shirt sizes. Table 21 with only 35 sizes or a savings of some 64% can meet the demand of over 90% of the recruits. Utilizing the concept of issuing the next larger size to those in the immediate range of available sizes increases availability to some 94%.

Table 21

Proposed Long-Sleeve Shirt Size Range

Neck Circumference	Sleeve Length					
	32	33	34	35	36	37
13.5		.5	.5			
14	1.5	2.3	2.8	1.6	.7	
14.5	2.0	4.4	5.1	4.2	2.0	
15	1.6	5.3	6.8	6.1	4.1	1.3
15.5	.9	2.9	5.4	6.0	4.2	1.5
16		1.6	2.5	2.8	2.7	1.2
16.5			1.0	1.5	1.4	.8
17				.4	.8	
Total %	6.0	17.0	24.1	22.6	15.9	4.8

Table 22 contains associated body measurements which will aid in clothing and pattern design. It was developed from the bivariate Tables G-33, neck circumference versus chest circumference; G-35, neck circumference versus vertical trunk; G-37, neck circumference by wrist circumference; and G-39, neck circumference by interscye distance. Table G-41, full back, is not a normal anthropometric measurement. It is arrived at by subtracting crotch height from cervical height. The r^2 values in Tables G-34, G-36, G-38, and G-40 are relatively high. Table G-42 has the lowest r^2 value, but again, a circumference is being compared to a length measure.

Table 22

Various Body Dimensions For

Proposed Shirt Construction

Neck Circumference	Chest Circumference	Full Back	Interscye Distance	Wrist Circumference	Vert. Trunk Circumference
13.5	36	27	16	7.25	64
14	37	28	17	7.25	65
14.5	39	28	17	7.5	67
15	40	29	18	7.75	68
15.5	41	29	18	7.75	70
16	42	29	18	8.0	72
16.5	43	30	18	8.0	73
17	45	30	19	8.25	74

Coverall

The Navy uses a number of different garments that fall in the coverall category. Basically there are two types. The first is a working garment which fits over another set of outer clothing. Examples of this are painter's coveralls, chemical suits, exposure suits, and disposable suits. The second fits over undergarments. Examples of this are flight suits and submarine jump suits. The latter are more form fitting and have been discussed.

For the purposes of this paper the flight coverall will be referred to. The Naval Air Systems Command defines coverall as follows:

> The coverall is a one-piece unlined garment fabricated from aramid cloth, a high temperature-resistant, inherently flame-retardent synthetic fabric with no hotmelt point or dip characteristics.[9]

The complexity of a one-piece garment must take into account such anthropometric measurements as height, weight, girth dimensions of chest, waist, hips, and such length dimensions as sleeve inseam and leg inseam. The covering of the limbs, although critical, is complex and almost given up on as can be seen in the following statements:

> The available standard flight suits may not fit exceptionally tall, long-limbed individuals.
>
> If custom-fitted flight suits are required, the Defense Personnel Support Center (DPSC) will honor special requisitions accompanied by specific measurement forms . . . .[10]

The flight suit of the Navy and Air Force are covered in the same specification. The Air Force funded a research project on improved sizing of flight suits. Based on a height/weight profile some four variations of four, six, eight, and twelve sizes were evaluated.[11]

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[9]NAVAIR, Manual Aviation-Crew System (Warminster, Pa.: Naval Air Development Center, 1983), pp. 65-72.

[10]Ibid.

[11]Milton Alexander, John McConville, and Ilse Tebbetts, Revised Height/Weight Sizing Programs for Men's Protective Flight Garments (Wright-Patterson Air Force Base, Ohio: U.S. Air Force Systems Command, 1979), p. 26.

According to Ed Gifford, Navy Flight Suit Project Manager, the Navy garment is issued based on height and weight of the pilot. The Air Force issue is based on the same criteria.[12]

Table 23 is extracted from the NAVAIR Manual Aviation-Crew Systems.[13] Note that the amount of freedom built into the garment moves from three and one-half inches for the smaller sizes up to five inches in the larger sizes in breast measurements. In this specification breast and chest are used interchangeably. This gives one the impression that more "ease" is required for larger personnel. Note too the inseam, crotch height in this metric measuring, tends to vary without rationale as follows:

	Sleeve Inseam	Leg Inseam
32 short	20 1/4	26½
34 short	20 1/4	26½
36 short	20 3/4	26½
38 short	20 3/4	26½
40 short	21	26½
42 short	21 1/4	26½

Note too, the leg inseam appears small. One must remember up until now the coverall is a large bag to cover the trunk of the body. Currently it hangs several inches below the crotch.

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[12]Telephone conversation and interview with Ed Gifford, Flight Suit Project Manager, Naval Air Development Center, Warminster, Pennsylvania, June 1984.

[13]Ibid.

Table 23

Flight Coverall

Coverall Sizes	Circumference Breast	Sleeve Inseam Length	Leg Inseam Length
32S	35 1/2	20 1/4	26 1/2
32R	35 1/2	22	28 1/2
34S	37	20 1/4	26 1/2
34R	37	22	28 1/2
36S	39 1/2	20 3/4	26 1/2
36R	39 1/2	22	28 1/2
36L	39 1/2	23	30 1/2
38S	42	20 3/4	26 1/2
38R	42	22	28 1/2
38L	42	23	30 1/2
40S	45	21	26 1/2
40R	45	22	28 1/2
40L	45	23	30 1/2
42S	47	21 1/4	26 1/2
42R	47	22 1/4	28 1/2
42L	47	23 1/4	30 1/2
44S	49	21 1/4	26 1/2
44R	49	22 1/4	28 1/2
44L	49	23 1/4	30 1/2
46S	51	21 1/4	26 1/2
46R	51	22 1/4	28 1/2
46L	51	23 1/4	30 1/2
48R	53	22 1/4	28 1/2
48L	53	23 1/4	30 1/2

Note: All dimensions are given in inches.

One gets the impression that the arms grow, but the legs do not. Table 24 was the maximum proposal by Alexander et al. and covers a 12-size height/weight program.[16]

Table 24

Size Categories and Tariff for Twelve-Size Height/Weight Program

Size	Weight	Height
Small Short	125.00 - 149.00	63.00 - 65.99
Small Regular	125.00 - 149.00	66.00 - 68.99
Small Long	125.00 - 149.00	69.00 - 71.99
Medium Short	150.00 - 174.00	64.50 - 67.49
Medium Regular	150.00 - 174.00	67.50 - 70.49
Medium Long	150.00 - 174.00	70.50 - 73.49
Large Short	175.00 - 199.00	66.00 - 68.99
Large Regular	175.00 - 199.00	69.00 - 71.99
Large Long	175.00 - 199.00	72.00 - 74.99
X-Large Short	200.00 - 224.00	67.50 - 70.49
X-Large Regular	200.00 - 224.00	70.50 - 73.49
X-Large Long	200.00 - 224.00	73.50 - 76.49

[16]Milton Alexander, John McConville, and Ilse Tebbetts, Revised Height/Weight Sizingh Programs for Men's Protective Flight Garments (Wright-Patterson Air Force Base, Ohio: U.S. Air Force Systems Command, 1979), p. 26.

The current flight garments are based on height, weight, and chest circumference. The mass of weight that is in the trunk, the arms or the legs adds confusion to the height/weight concept, in the author's opinion. Appendix G, Table G-43 is the bivariate table for stature versus weight and Table G-44 provides the statistical data showing an r^2 value of 23.764%.

Appendix G, Table G-45 is the bivariate table of stature by vertical trunk with the appropriate statistical data in Table G-46. Here the correlation is .52915 and the r^2 is 28.0%. There is a stronger correlation between the stature and vertical trunk circumferences than there is between stature and weight.

In Appendix G, Table G-47, the bivariate for chest circumference and vertical trunk is even more appealing. Its statistical data, Appendix G, Table G-48, has an r^2 value of .37258, an even greater value than the ones above. This has the added appeal of having two key measurement factors--that of chest circumference and vertical trunk circumference. In one sense, if these fit correctly then one could take four tubes for sleeve and leg coverage and just trim off the excess cloth. This will just not be done, however.

Prior to identifying a specific size range and tariff for the coverall, a generic parameter must be established. Using Tables E-63, G-49 and G-50, it was decided by the author to start with the vertical trunk mean 64.611 (64.5 for practical purposes) and move one full standard deviation in each direction away from the mean. This then is the basis for Table 25.

Table 25

Proposed Sizes for Vertical

Trunk Generic

Vertical Trunk Circumference (inches)	Generic Name	Percent Sample Population
53.0 - 57.49	X-small	1.3
57.5 - 60.99	Small	10.7
61.0 - 64.99	Medium	32.5
64.5 - 67.99	Large	35.0
68.0 - 71.49	X-large	16.3
71.5 - up	XX-large	4.2

Table 26 is the proposed size range. The vertical trunk was divided at the mean and then sectioned off at standard deviations. This provides six generics of extra small, small, medium, large, extra large, and extra extra large. There are a few more sizes than are currently carried, but the fit should be a great deal better. The suggested listing totals 90% of the sample population, again meeting this stated goal.

Table 27 is the various body dimensions for the coverall. The generic sizes are from Table 26. It was determined that to have an array of leg and arm dimensions by size would vastly increase the range of the coverall and make it uneconomical. The sleeve and leg or crotch height dimensions were taken from Appendix G, Table G-13 for sleeve length to chest circumference and Table G-49 for vertical trunk to crotch height.

Table 26

Proposed Size Range and Tariff for Coverall

Chest Circumference	Vertical Trunk					
	X-Small	Small	Medium	Large	X-Large	XX-Large
32	.3	.6	.7			
34	.6	3.3	5.6	2.3		
36	.4	3.4	11.3	9.2	1.8	
38		1.9	8.3	11.0	4.0	.4
40		.4	2.8	6.4	4.8	.8
42			.6	2.2	2.7	1.3
44				.3	1.0	1.0
46					.3	.3
Total %	1.3	9.6	29.3	31.4	14.6	3.8

The dimensions were arrived at for sleeve length by taking Table G-13. For each chest circumference 90% of the sample population for that size about the median was computed and the largest sleeve length measurement taken. Here again such a size will fit the population at or better than the current standard.

A similar computation was performed on Appendix Table G-49 using each generic of X-small, small, medium, etc., as described earlier. In this manner the crotch height was established.

The anthropometric measurements associated with the coverall are the dimensions in Table 28. These were derived by taking the appropriate bivariate tables with one of the variables being the vertical trunk circumference, dividing the table into the generic

segments shown in Table 25 and again establishing a 90% range about the median of each generic.

Table 27

Proposed Sleeve and Leg Dimensions for Coverall

Generic Size *		Sleeve Length	Crotch Height
32	X-Small	34	34
	Small	34	35
	Medium	34	35
34	X-Small	35	34
	Small	35	35
	Medium	35	35
	Large	35	36
36	X-Small	36	34
	Small	36	35
	Medium	36	35
	Large	36	36
	X-Large	36	36
38	Small	37	35
	Medium	37	35
	Large	37	36
	X-Large	37	36
	XX-Large	37	37

Table 27 - Continued

40	Small	37	35
	Medium	37	35
	Large	37	36
	X-Large	37	36
	XX-Large	37	37
42	Medium	38	35
	Large	38	36
	X-Large	38	36
	XX-Large	38	37
44	Large	38	36
	X-Large	38	36
	XX-Large	38	37
46	X-Large	38	36
	XX-Large	38	37

*Note: As indicated earlier this generic size relates to body type.

Table 28

Various Body Dimensions for

Proposed Coverall Construction

Vertical Trunk	Weight[a]	Interscye Dist.	Cervical Height	Hip Circumference	Waist Circumference
X-small	135	16	58	35	30
Small	155	17	61	37	32
Medium	175	17	62	39	34
Large	195	18	63	41	36
X-large	215	18	64	43	38
XX-large	235	19	65	44	42

Note: a = weight in pounds

The bivariate tables used were G-51, weight by vertical trunk, G-53, interscye distance by vertical trunk, G-55, cervical height by vertical trunk, G-57, hip circumference by vertical trunk, and G-59, waist circumference by vertical trunk. Table G-52 provides the statistical data of weight to vertical trunk. Note the $\underline{r^2}$ value of 52.7% showing a very high correlation. The remaining bivariate tables and statistical data in Appendix G are for general information purposes. It was felt that this information may be useful and should not be lost. The correlation in these tables are not considered necessary for pattern or garment design by the author.

The findings in this chapter are considered significant by the author. Their impact will be identified in the final chapter.

The objectives, as stated in Chapter I, are twofold:

1. To improve the clothing and pattern design of the U.S. Navy Male Recruit by utilizing the anthropometric data to develop:
   a. interval tables (these are reflected in Appendix F)
   b. frequency tables (these are reflected in Appendix F)
   c. percentile tables (these are reflected in Appendix E)
   d. Tables of statistical values (these are reflected in Appendix E and the even tables of Appendix G)
   e. Bivariate tables (these are reflected in the odd tables of Appendix G).

   As to this last objective, the establishment of different generic sizes range as reflected in Table 7, and the change of the generic stature and one of the key dimension variables in coveralls make it impossible to provide a true correlation between current and proposed sizing.

   Based on the statistical evaluations, a variation was also made to the various segments of each garment. In comparing current segments against the population, one can see improved fit.

2. To propose tariff improvements, if possible, through the use of bivariate tables.

One must consider that a clothing tariff, identified in Chapter I, "the number of garments of each size which must be provided for a given population", is the initial suggested inventory until actual

demand data can be accumulated. Since this study suggests such a wide deviation from current sizing techniques, it is felt a tariff is required.

Table 29 is the proposed tariff for the coat and jumper. It was derived by multiplying the percentages by size, of table 9 by a factor of 1.11. This factor multiplied by the percentages in Table 29 now equates to a 100% level. A clothing tariff is calculated as follows; one takes the expected population, e.g., 1,234 recruits, and multiplies this number by each size to be carried. As an example size 36 Regular has a value of 5.56% times 1,234 equals 68.6 or 69 size 36 Regulars which will be stocked. This procedure will then assure the ability to fit 90% of the 1,234 recruits with a coat and jumper.

Table 30 covers the proposed tariff for trousers. Here the factor used was also 1.11 since Table 17 covers 90.3% of the population. Table 31 covers the proposed long sleeve shirt tariff. Since Table 31, on long sleeve shirts, is capable of fitting 90.4% of the population, a factor of 1.11 was used again.

The coverall tariff is covered in Table 32. Here, 90% of the population can be covered by Table 26 and, as in the coat and jumper, again, a multiple of 1.11 is used.

The results of this independent study are the basis for the final chapter. The summary, conclusions, and recommendations for future work are in the next chapter.

Table 29

PROPOSED SIZE TARIFF FOR COAT & JUMPER

GENERIC SIZE

CHEST CIRCUMFERENCE	X-SHORT	SHORT	REGULAR	LONG	X-LONG	XX-LONG
32	.33					
33	.56	1.67				
34	.56	3.00	3.00	2.22	.89	
35	.56	3.33	4.77	4.33	1.22	.44
36	.44	2.89	5.56	5.77	2.11	.44
37	.44	2.78	4.88	5.66	2.55	.56
38	.33	2.00	4.33	5.11	2.33	.44
39		1.33	2.78	4.22	2.11	.44
40		1.11	1.89	2.78	1.33	.33
41			1.33	1.78	1.11	
42				1.22	.67	
TOTAL	3.22	18.11	28.54	33.10	14.32	2.65

Table 30

PROPOSED SIZE TARIFF FOR TROUSER

GENERIC SIZE

WAIST CIRCUMFERENCE	X-Short	Short	Regular	Long	X-Long	XX-Long
27		0.9	0.9			
28		2.0	2.0	1.6		
29	0.8	3.0	4.2	3.3	1.0	
30	0.6	3.3	5.8	4.8	1.4	
31		2.9	4.8	5.6	2.3	0.4
32		2.2	3.3	5.2	2.1	0.4
33		1.7	3.0	3.8	1.9	0.6
34		1.2	2.2	2.8	1.3	0.3
35		0.6	1.6	2.2	1.1	0.4
36		0.6	1.6	1.8	1.0	
37			0.6	1.4	0.8	
38			0.6	1.0	0.7	
39				0.9		
TOTAL:	1.4	18.4	30.6	34.4	12.7	2.1

Table 31

PROPOSED SIZE TARIFF FOR LONG SLEEVE SHIRT

NECK CIRCUMFERENCE	SLEEVE LENGTH 32	33	34	35	36	37
13.5		0.5	0.5			
14.0	1.7	2.6	3.1	1.8	0.8	
14.5	2.2	4.9	5.7	4.7	2.2	
15.0	1.8	5.9	7.5	6.8	4.6	1.4
15.5	1.0	3.2	6.0	6.7	4.7	1.7
16.0		1.8	2.8	3.1	3.0	1.3
16.5			1.1	1.7	1.6	0.9
17.0				0.4	0.9	
TOTAL	6.7	18.9	26.7	25.2	17.8	5.3

Table 32

PROPOSED SIZE TARIFF FOR COVERALL

CHEST CIRCUMFERENCE	GENERIC SIZE X-Small	Small	Medium	Large	X-Large	XX-Large
32	.33	.67	.78			
34	.67	3.66	6.22	2.55		
36	.44	3.77	12.54	10.21	2.00	
38		2.11	9.21	12.21	4.44	.44
40		.44	3.11	7.10	5.33	.89
42			.67	2.44	3.00	1.44
44				.33	1.11	1.11
46					.33	.33
TOTAL:	1.44	10.65	32.53	34.84	16.21	4.21

NOTE: This is by body type

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Based on the literature and the author's experience, it was concluded that a study of this nature was needed for several reasons. First, the current uniforms are ill-fitting on Navy recruits when the alterations amount to more than trouser or sleeve length hemming, requiring a significant amount of tailoring. Second, anthropometric studies provide voluminous data which are beyond the comprehension of a patternmaker or pattern designer who may have finished high school. These studies require a breakdown which will provide meaningful information and benchmarks of body dimensions. Third, existing garment patterns had no statistical basis, or for that matter, any continuous rationale. In this a patternmaker's concept of the body would change from garment to garment. Fourth, patternmakers or designers had no idea of actual body dimensions. Normally they would use their own measurements as a standard and arithmetically or arbitrarily grade up and down from that point. Last, the patternmakers or designers would change existing pattern dimensions based on a statistically invalid analysis of the recruits. The thought here was that if the thick-necked wrestler, the broad-shouldered football player, or the long-limbed basketball player were included in the measurements, then all would be able to be fitted.

The data analyzed in this report covered the Navy segment of the 1966 Armed Forces anthropometric study. The sample population was 4096

Navy Male recruits and included 70 anthropometric measurements. Although these data are 19 years old, they are still valid because there has been a minimal amount of body change which would impact on garments. Air Force studies 30 years apart indicate the mean for stature increased only one-half inch and ten pounds in weight.

Through the use of the mean and standard deviation, ranges were established for the generic stature and generic body type sizes. With these as the building blocks, new sizes were selected for a series of garments. The garments chosen, --the coat, the jumper, the trouser, the long sleeve shirt, and the coverall,-- provided an array of uniform items.

In each anthropometric measurement interval, frequency and percentile tables were established. In addition statistical values were determined. Bivariate data were developed where two variables had an impact on pattern making.

By use of the bivariate data, benchmarks were established on various measurements through using the median and then encompassing it with 90% of the population within that measurement. The benchmark is the primary point required of segments of the body in order to establish and grade a pattern.

By the use of the bivariate data, the mean, and the standard deviation, generic signs of stature and body type were established. To determine the individual sizes and the segments of the patterns such as waist circumference, hip circumference, and arm circumference on the upper-torso garments, the median was used as the central point of tendency. Based on this procedure the actual body sizes were more

clearly defined, and benchmarks for the patternmaker were established. Based on the proposed range of sizes for the garments listed, a tariff was established. This tariff shows the ratio of sizes required by the garment type to assure support at the 90% level.

Utilizing the mean of the stature as a focal point, approximately one-half a standard deviation was marked above and below as the range of the regular (Table 7, Generic Size Evaluation). Increments of one standard deviation were added on either side to establish the next size, such as short and long.

Once the generic size for stature was established, a proposed range of sizes was established for the coat, jumper, and trouser. The proposed range of sizes for each would assure fitting 90% of the male recruits. In addition, certain dimensions required in patternmaking for each garment were established. These became the benchmarks that have been missing from previous anthropometric studies. This now provides the patternmakers or designers the exact dimensions of the body by size.

The garments so treated were the coat, long-sleeve shirt, jumper, trouser and coverall. The results of this study using the 90% criterion yielded a decrease in the number of sizes for the coat, long sleeve shirt, jumper and trouser and an increase in the coverall. These supported reductions in the tariff are the coat at 27%, the jumper at 16%, the long sleeve shirt at 64% and the trouser at 57%. Since the total concept of sizing has been changed by this study for the coverall, the increase of sizes will not be discussed. In addition, the use of primary anthropometric measurements, such as weight, hip circumference, wrist circumference, arm scye circumference, waist height, interscye

distances and cervical height will result in an improved fit of each of the garments.

With the full body type of garment, the coverall, it was determined that the vertical trunk circumference was a better key value than weight. Here too the mean was established for the generic size by body type. From this point a whole standard deviation was selected moving up or down from the mean. With this the key segment of the garment was also determined as above.

Conclusion

The application of the statistical approach is valid. The statistical data in the appendices show extremely high correlation based on the F and t tests. The statistical approach accomplishes the goal established in this study.

Through the use of statistical methods a positive generic stature size and generic body type size was established. Utilizing these new generic sizings an improved fit of garments and a reduction in the tariff are accomplished.

Recommendations

First, it is recommended that the Navy adopt the proposed generic size method for developing sizing and grading.

Second, it is recommended that the Navy make use of the prepared coat, jumper, long sleeve shirt, trouser, and coverall size ranges and tariffs which have been evaluated in this study in the development of garment patterns.

Third, it is recommended that consideration be given to expanding the study utilizing this approach.

Fourth, it is recommended that this study be applied to appropriate groups of the civilian industry.

Fifth, it is recommended that anthropologists and clothing designers establish the measuring points required in garment and pattern construction such as fly and buttocks drop.

Sixth, it is recommended that the data developed in this study be subjected to factor analysis and cluster analysis for improved statistical information.

Seventh, it is recommended that the format of Appendix H be used in the development of anthropometric data to establish the sizes and pattern of garments.

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APPENDIX A

COMMANDER NAVAL SUPPLY SYSTEMS COMMAND

LETTER

DEPARTMENT OF THE NAVY
WASHINGTON, D. C. 20376

Commander
Naval Supply Systems Command

15 OCT 1980

Chief of Supply Corps

Commander Richard A.J. Ranieri, SC, USN (Ret.)
801 Winview Drive
Greensboro, North Carolina 27410

Dear Commander Ranieri:

I received your letter of 24 September 1980 regarding your proposed dissertation topic on clothing and pattern design size measurements. Regretfully, the requested 1977 raw data from the RTC Great Lakes study cannot be located. However, as part of the U.S. Armed Forces Anthropometric Surveys of 1966, a total of 4095 U.S. Navy recruits (men) were measured at RTC's Great Lakes and San Diego by a group of anthropologists. A copy of their survey is attached. In addition, the Air Force Aerospace Medical Research Laboratory has data from other anthropometric surveys conducted on both military and civilian population. Magnetic tapes of the aforementioned anthropometric surveys are available, upon written request, from the National Technical Service, Springfield, Virginia 22161.

Please contact Ms. Sirvart Mellian (AC 202-695-5464) on my staff in the event you have further questions or desire additional assistance.

Best wishes in pursuing your Doctrate degree.

Sincerely,

E.A. GRINSTEAD
Rear Admiral, SC, USN

Attachment

APPENDIX B

DEFINITIONS

DEFINITIONS

Bag Allowance: A term used in lieu of "Initial Issue" references all the items issued and can be placed in the Navy male recruits duffle bag.

Bag Item: Any item of the "Initial Issue" or bag allowance.

Bench Mark: The primary points required of segments of the body in order to establish and grade a pattern.

Clothing Tariff: The number of garments of each size which must be provided for a given population.

Design Value: A single numerical value for each variable that represents the actual body measurement for which a given end item will be designed. The design value can be any combination of the mean plus or minus some increment of the within-a-size standard deviation.

Ease: The amount of dimension over body measurements to allow for comfort and freedom of movement. The fashion style dictates the amount of ease built into an article of clothing or footwear.

Flight Coveralls: The coverall is a one-piece unlined garment fabricated from Aramid cloth, a high temperature-resistant, inherently flame-retardent synthetic fabric with no hotmelt point or dep characteristics.

Generic Size: Relates to the descriptive terms of short, regular, long, etc. when pertaining to stature, as in the coat or trouser length e.g. 38 regular, or as small, medium, large, etc. when pertaining to a body type, as in coveralls.

Grading: The difference between similar body measurements of consecutive sizes within a classification is called a grade. (U.S. Department of Commerce Voluntary Product Standard PS42-70, 1970, p. 1.)

Initial Issue: The initial uniform requirements for enlisted personnel will be provided at the Recruit Training Centers. Officers will be provided an initial uniform allowance to supplement the purchase of uniforms.

Initial Monetary Clothing Allowance Item: Reference to "Initial Issue," the value of each item in the Navy male recruit uniform.

Special Order Issue: The ordering of tailor made articles of uniform for personnel whose measurements are outside the standard measurement garments.

APPENDIX C

COST OF ACCOMMODATING ADDITIONAL PERCENTAGES OF A USER-POPULATION IN MID-RANGE UNITS

Cost of Accommodating Additional Percentages of

a User-Population in Mid-Range Units

Population Percentages	Cost in Mid-Range Units*
50th to 51st	1.00 unit
60th to 61st	1.04 units
70th to 71st	1.16 units
75th to 76th	1.27 units
80th to 81st	1.45 units
85th to 86th	1.75 units
90th to 91st	2.36 units
91st to 92nd	2.56 units
92nd to 93rd	2.82 units
93rd to 94th	3.15 units
94th to 95th	3.59 units
95th to 96th	4.22 units
96th to 97th	5.18 units
97th to 98th	6.88 units
98th to 99th	10.86 units
(99th to 99.5th)	19.88 units/percent
(99.5th to 99.9th)	51.24 units/percent

APPENDIX D

U.S. NAVY ANTHROPOMETRIC SURVEY - 1966

U.S. Navy Anthropometric Survey - 1966

Mr. Robert White was the Project Director of the Armed Forces Anthropometric Survey covering the Army, Navy, and Marine Corps segments. The following two sections are extracts from his two published reports on the Army[1] and the Marine Corps[2] covering "Planning and Organization" and "Methodology and Techniques" because he used the same concept in each of the three surveys. The only change is the term Navy vice Army or Marine Corps, where applicable.

a. Planning and Organization

> A request for the conduct of a new anthropometric survey of the U.S. Navy was initiated by the Defense Supply Agency in April 1964. It was planned that the Navy survey would be carried out in conjunction with similar surveys of personnel in the other services of the Armed Forces.
>
> Responsibility for planning and organizing the Army survey was assigned to the U.S. Army Natick Laboratories, Natick, Massachusetts by the U.S. Army Material Command. Since the Natick Laboratories did not have either the civilian or military personnel to carry out a large-scale anthropometric survey in the field, assistance was requested from the U.S. Army General Equipment Test Activity, an element of the U.S. Army Test and Evaluation Command, located at Fort Lee, Virginia. This activity provided the military personnel, as well as the administrative and logistic support for the collection of the anthropometric data during the survey. Twenty enlisted men were requested from Fort Meade, Maryland; these men were members of the 11th Armored Cavalry Regiment and

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[1] Robert M. White and Edmund Churchill, The Body Size of Soldiers: U.S. Army Anthropometry - 1966. Technical Report 72-51-CE (Natick, Mass.: U.S. Army Natick Laboratories, 1971), pp. 7-10.

[2] Robert M. White and Edmund Churchill, United States Marine Corps Anthropometry. Technical Report TR-78-021 (Natick, Mass.: U.S. Army Natick Research and Development Command, Clothing, Equipment and Materials Engineering Laboratory, 1977), pp. 16-19.

were assigned to USAGETA, Fort Lee for temporary duty to serve on the measuring teams for the duration of the survey.

Technical direction and monitorship of the scientific aspects of the survey were the responsibilities of Natick Laboratories anthropoligists. Administrative planning and supervision, scheduling and travel arrangements, and logistic support were performed by the General Equipment Test Activity under the direction of an officer who served as Project Director, assisted by a sergeant, who served as Administrative Coordinator.

In the field, the survey team was directed and supervised by a Survey Officer, assisted by a non-commissioned officer in charge (NCOIC). The measuring team personnel were organized into three teams, each with a team leader and six measures. At each installation where measuring was carried out, additional enlisted men were requested on a temporary basis to serve as data recorders.

The Project Director was authorized to establish direct coordination with the various Navy installations which would be visited by the measuring team. In planning the schedule for the survey, the project director contracted a designated project officer at each installation to be visited and provided information on the plan of operations, as well as on the number of men required to be measured, the space and equipment required, and the efficient scheduling of personnel. A liaison officer visited each installation prior to the team's scheduled arrival in order to carry out the final coordination of plans and to provide guidance to the installation project officer.

The installation project officers were designated by the respective participating Navy installations. It was the responsibility of the installation project officer to assist the project director and the survey officer in liaison functions and installation administrative procedures, including the provision of facilities and equipment required and the scheduling of participants for a smooth flow of men through the measuring lines. He was also responsible for providing the additional personnel required, as well as the quarters and messing facilities for the measuring team personnel.

b. Methodology and Technique

The first step in the technical planning for the Navy anthropometric survey consisted of the selection of body measurements to be taken. Primary consideration was given to the problem of selecting a large enough number of measurements to be useful for a variety of requirements, while at the same time keeping the number of measurements to a manageable minimum suitable for a large-scale survey. A total of seventy body measurements was selected. These included weight, standing measurements, sitting measurements, breadth measurements, circumferences and body surface measurements, as well as measurements of the head and face, the hands, and the feet. It was felt that this selection of dimensions, while not as extensive or inclusive as it might be, still would provide most of the data and body size information required for the efficient design and sizing of military clothing and personal equipment, as well as for basic human engineering information necessary in the design of military vehicles, aircraft, and other weapons systems.

Following the selection of the body measurements to be taken, a data sheet was drawn up which would be used for the recording of the anthropometric data in the field. The format of the data sheet was arranged to facilitate transcription of the data to punch cards; column numbers for the punch cards were indicated on the data sheet. Five punch cards were required for each man measured; the first card contained the background data on each individual, while the remaining four cards contained the anthropometric data. The background data were coded to simplify punching and subsequent data processing. The body measurements were measured and recorded in millimeters, while weight was measured and recorded to the nearest whole pound . . . .

Standard techniques of measurement and standard anthropometric measuring instruments were used throughout the survey. The anthropometer (Siber Hegner 101) consisted of four tubes which fit together to form a rigid rod; it is calibrated in millimeters, with the scale running from zero to the base up to 2000 mm at the top. The anthropometer has one fixed arm at the top and a second arm on a sliding sleeve which can be moved up and down on the rod. The full anthropometer was used to measure stature and other major body

heights and lengths. The lower half of the anthropometer was used for lesser height, such as crotch height, kneecap height, or calf height. The top half of the anthropometer was used as a large sliding caliper for taking body breadths and also measurements of the arms and legs, such as elbow-fingertip length and buttock-knee length. A millimeter scale on the reverse side of the instrument was used when taking this type of measurement.

Small sliding calipers (Siber Hegner 104), with straight arms, were used for various measurements of the face and hands. Spreading calipers (Siber Hegner 106), with curved arms, were used for other measurements of the head and face. A two-meter steel tape (K & E Tip Top Wyteface), graduated in millimeters, was used for all circumference and body surface measurements.

In addition to the standard instruments, several other items of equipment were used in the survey. Foot measurements (i.e., foot length, instep length, and foot breadth) were taken with a foot board, which consists of a metal tray fitted with a sheet of millimeter graph paper covered with transparent plastic. In taking the foot measurements, a wooden block was held against the toe or the ball of the foot and the value of the dimension was read on the scale. In positioning the knees for taking leg measurements on a seated individual, a box was used as a foot-rest; squares of plywood were added to elevate the feet when necessary in order to have the thighs level and the knees at right angles.

In planning the measuring process in detail, an attempt was made to develop a system which would permit accurate and rapid measurement of men, but which also would insure a relatively smooth and efficient progression of men through the processing line. To this end, a sequence of six measuring stations was planned. The seventy body measurements to be taken were divided up into groups or blocks of measurements; each of these blocks of measurements was taken at one of the measuring stations. The selection of the measurement groupings was based partly upon the measuring instrument (or instruments) to be used at that station and partly upon the position or posture required of the man to be measured at that station. This was done primarily to reduce time and motion to a minimum.

The actual measurement procedure may be outlined as follows. After a brief orientation concerning the purpose of the anthropometric survey, the men to be measured were requested to strip to their undershorts. Each man then reported to Station #1, where his name, rank, service number, and the rest of the background data were entered on his data sheet. He also was asked to estimate his weight and height, and then his weight was measured to the nearest pound on platform scales. The subject then moved on to Station #2 for a group of height measurements, taken with the anthropometer, and to Station #3 for a group of breadth and length measurements, taken with the large calipers. At Station #4, spreading and sliding calipers, and the foot board were used for a group of head, face, hand and foot measurements. Circumferences and body surface measurements (such as sleeve length and waist back length) were taken with a steel tape at the last two locations, Stations #5 and #6. Specific descriptions of the individual body measurements, including the position of the subject, how the measurement was taken and the instrument used, may be found in with the data on each measurement.

A measurer worked at each station and took the specific group of measurements assigned to that station. The measurer was assisted by a data recorder at each station.

In order to process and measure large numbers of men rapidly and efficiently, it was planned to operate three measuring lines simultaneously. Therefore, in a typical measuring operation, there were three sets of six stations, manned by three measuring teams, each of six men. With all stations in operation, 18 men were being measured at once, and normally three to five men would be waiting their turn at each station.

Before initiation of the measuring and data collection in the survey, training sessions for the measuring teams were held at Fort Lee, Virginia. Initially, the measuring personnel were briefed on the survey and on anthropometric techniques. Visual training aids were used to illustrate the measurements and the sequence of stations. The measurers were then shown the anthropometric instruments and assigned to their respective measuring stations. Thus, the measurers could specialize in the use of one type of

> instrument and learn to take a specific group or block of body measurements. Training in the use of the instruments was carried on by having the measurers practice on each other and then measure a small group of subjects in trial runs. The training and practice were continued until a satisfactory level of accuracy and consistency was attained.

Location

These data were collected by Mr. White's team at the, then, two Recruit Training Centers (RTC) of Great Lakes, Illinois and San Diego, California. Approximately 2,048 recruits were measured at each RTC. These measurements wee taken in the spring of 1966.

APPENDIX E

TABLES OF PERCENTILES

Table E-1

WEIGHT

PERCENTILES

KILOGRAMS		POUNDS
100.58	99 TH	221.73
97.00	98 TH	213.85
94.62	97 TH	208.60
91.31	95 TH	201.30
86.18	90 TH	189.99
82.78	85 TH	182.50
80.18	80 TH	176.76
78.00	75 TH	171.96
76.12	70 TH	167.82
74.45	65 TH	164.13
72.92	60 TH	160.76
71.49	55 TH	157.62
70.14	50 TH	154.64
68.84	45 TH	151.77
67.59	40 TH	149.01
66.35	35 TH	146.27
65.10	30 TH	143.52
63.82	25 TH	140.70
62.46	20 TH	137.70
60.97	15 TH	134.42
59.19	10 TH	130.50
56.66	5 TH	124.91
55.00	3 RD	121.24
53.72	2 ND	118.43
51.54	1 ST	113.62

THE SUMMARY STATISTICS

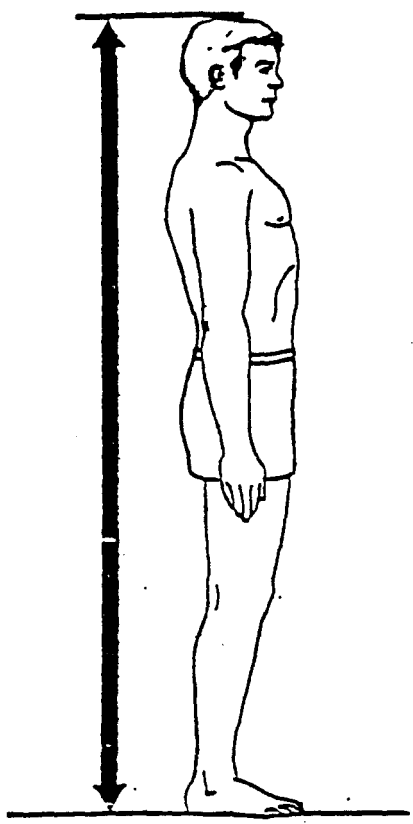
KILOGRAMS		POUNDS
71.56	MEAN	157.75
0.17	SE(M)	0.36
10.56	ST DEV	23.28
0.12	SE(SD)	0.26

SYMMETRY--BETA I = 0.65
KURTOSIS--BETA II = 3.37
COEFFICIENT OF VARIATION = 14.76

SAMPLE SIZE = 4091

Table E-2

STATURE



Stature: Subject stands erect, with heels together and head level. Stature is measured as the vertical distance from the floor to the top of the head (vertex). An anthropometer is used, with the anthropometer arm firmly touching the scalp to compress the hair.

PERCENTILES

CENTIMETERS		INCHES
191.11	99 TH	75.24
189.36	98 TH	74.55
188.19	97 TH	74.09
186.57	95 TH	73.45
184.01	90 TH	72.44
182.27	85 TH	71.76
180.90	80 TH	71.22
179.72	75 TH	70.76
178.68	70 TH	70.35
177.73	65 TH	69.97
176.84	60 TH	69.62
175.98	55 TH	69.28
175.15	50 TH	68.95
174.32	45 TH	68.63
173.50	40 TH	68.31
172.65	35 TH	67.97
171.78	30 TH	67.63
170.84	25 TH	67.26
169.81	20 TH	66.85
168.62	15 TH	66.39
167.13	10 TH	65.80
164.93	5 TH	64.93
163.47	3 RD	64.36
162.37	2 ND	63.93
160.59	1 ST	63.22

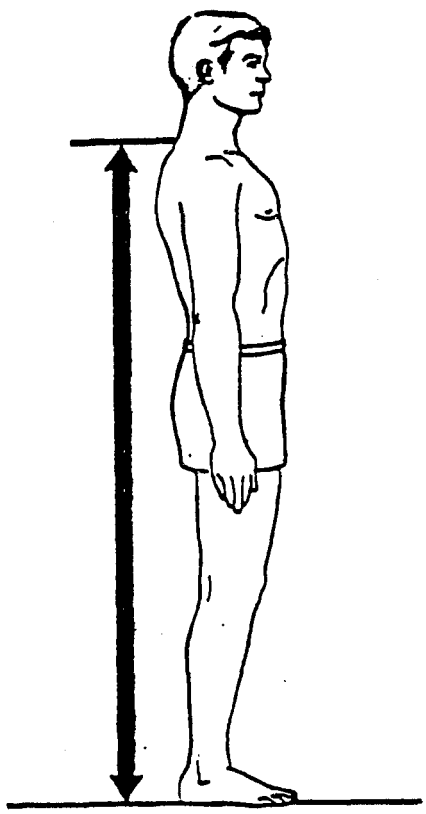
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
175.33	MEAN	69.03
0.10	SE(M)	0.04
6.53	ST DEV	2.57
0.07	SE(SD)	0.03

SYMMETRY--BETA I = 0.12
KURTOSIS--BETA II = 3.03
COEFFICIENT OF VARIATION = 3.73

SAMPLE SIZE = 4095

Table E-3 CERVICALE HEIGHT



Cervicale Height: Subject stands erect, with heels together and head level. Cervicale height is measured as the vertical distance from the floor to the cervical point (the bony protrusion of the 7th cervical vertebra at the base of the neck). An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
164.75	99 TH	64.86
163.11	98 TH	64.22
162.02	97 TH	63.79
160.48	95 TH	63.18
158.04	90 TH	62.22
156.37	85 TH	61.56
155.06	80 TH	61.05
153.93	75 TH	60.60
152.92	70 TH	60.21
152.00	65 TH	59.84
151.14	60 TH	59.50
150.31	55 TH	59.18
149.50	50 TH	58.86
148.70	45 TH	58.54
147.90	40 TH	58.23
147.08	35 TH	57.90
146.22	30 TH	57.57
145.31	25 TH	57.21
144.30	20 TH	56.81
143.15	15 TH	56.36
141.69	10 TH	55.79
139.54	5 TH	54.94
138.12	3 RD	54.38
137.05	2 ND	53.96
135.31	1 ST	53.27

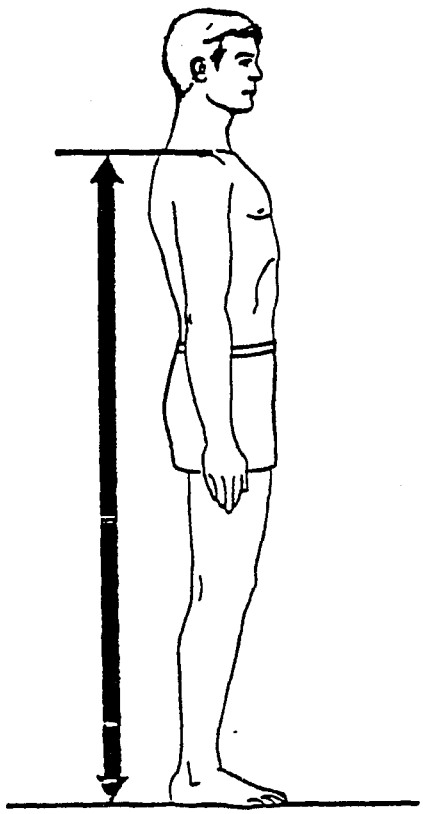
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
149.63	MEAN	58.91
0.10	SE(M)	0.04
6.32	ST DEV	2.49
0.07	SE(SD)	0.03

SYMMETRY--BETA I = 0.10
KURTOSIS--BETA II = 3.05
COEFFICIENT OF VARIATION = 4.22

SAMPLE SIZE = 4095

Table E-4 SHOULDER HEIGHT



Shoulder Height (Acromiale Height): Shoulder height is measured as the vertical distance from the floor to the outer point (acromion) of the right shoulder. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
159.20	99 TH	62.68
157.44	98 TH	61.98
156.27	97 TH	61.53
154.66	95 TH	60.89
152.14	90 TH	59.90
150.44	85 TH	59.23
149.13	80 TH	58.71
148.01	75 TH	58.27
147.02	70 TH	57.88
146.12	65 TH	57.53
145.29	60 TH	57.20
144.49	55 TH	56.89
143.72	50 TH	56.58
142.95	45 TH	56.28
142.20	40 TH	55.98
141.42	35 TH	55.68
140.62	30 TH	55.36
139.75	25 TH	55.02
138.79	20 TH	54.64
137.69	15 TH	54.21
136.28	10 TH	53.65
134.12	5 TH	52.80
132.63	3 RD	52.22
131.47	2 ND	51.76
129.50	1 ST	50.98

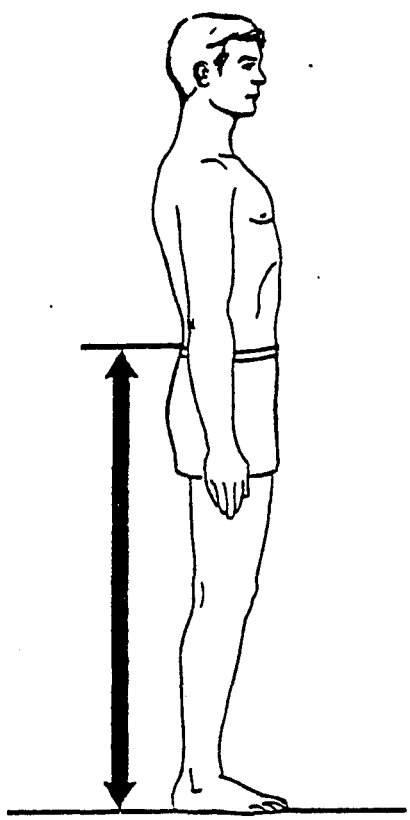
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
143.95	MEAN	56.67
0.10	SE(M)	0.04
6.18	ST DEV	2.43
0.07	SE(SD)	0.03

SYMMETRY--BETA I = 0.13
KURTOSIS--BETA II = 3.08
COEFFICIENT OF VARIATION = 4.29

SAMPLE SIZE = 4095

Table E-5 WAIST HEIGHT



Waist Height (Iliocristale Height): Subject stands erect, with heels together. Waist height is measured as the vertical distance from the floor to the upper edge (iliac crest) of the right hip bone. An anthropometer is used.

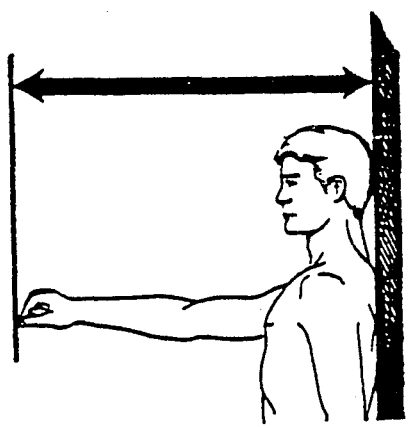
PERCENTILES

CENTIMETERS		INCHES
119.72	99 TH	47.14
118.12	98 TH	46.50
117.09	97 TH	46.10
115.68	95 TH	45.54
113.50	90 TH	44.68
112.04	85 TH	44.11
110.89	80 TH	43.66
109.90	75 TH	43.27
109.03	70 TH	42.93
108.23	65 TH	42.61
107.48	60 TH	42.31
106.75	55 TH	42.03
106.04	50 TH	41.75
105.33	45 TH	41.47
104.62	40 TH	41.19
103.89	35 TH	40.90
103.12	30 TH	40.60
102.29	25 TH	40.27
101.36	20 TH	39.91
100.29	15 TH	39.48
98.92	10 TH	38.95
96.86	5 TH	38.13
95.47	3 RD	37.59
94.43	2 ND	37.18
92.72	1 ST	36.50

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
106.13	MEAN	41.78
0.09	SE(M)	0.03
5.64	ST DEV	2.22
0.06	SE(SD)	0.02
	SYMMETRY--BETA I =	0.08
	KURTOSIS--BETA II =	3.04
	COEFFICIENT OF VARIATION =	5.32
	SAMPLE SIZE =	4094

Table E-6 FUNCTIONAL REACH



Functional Reach: Subject stands erect against a wall, with his right arm extended forward horizontally, and with the tips of his thumb and index finger pressed together; his shoulders must remain in contact with the wall. Functional reach is measured as the horizontal distance from the wall to the tip of the thumb. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
92.88	99 TH	36.57
91.46	98 TH	36.01
90.57	97 TH	35.66
89.37	95 TH	35.18
87.54	90 TH	34.46
86.32	85 TH	33.99
85.38	80 TH	33.61
84.57	75 TH	33.29
83.85	70 TH	33.01
83.19	65 TH	32.75
82.58	60 TH	32.51
81.98	55 TH	32.28
81.40	50 TH	32.05
80.82	45 TH	31.82
80.23	40 TH	31.59
79.63	35 TH	31.35
79.00	30 TH	31.10
78.33	25 TH	30.84
77.57	20 TH	30.54
76.70	15 TH	30.20
75.60	10 TH	29.76
73.96	5 TH	29.12
72.89	3 RD	28.70
72.09	2 ND	28.38
70.81	1 ST	27.88

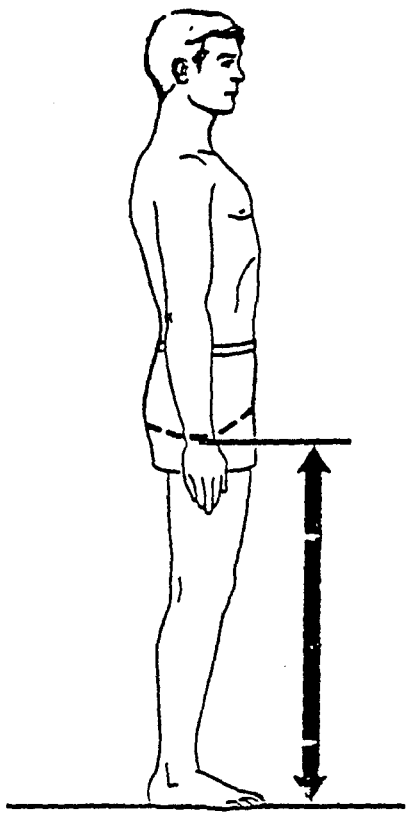
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
81.49	MEAN	32.08
0.07	SE(M)	0.03
4.66	ST DEV	1.83
0.05	SE(SD)	0.02

SYMMETRY--BETA I = 0.11
KURTOSIS--BETA II = 3.08
COEFFICIENT OF VARIATION = 5.71

SAMPLE SIZE = 4089

Table E-7 CROTCH HEIGHT



Crotch Height: Subject stands erect, with his feet initially apart and then brought together after the anthropometer is in place. Crotch height is measured as the vertical distance from the floor (or standing surface) to the crotch. An anthropometer is used, with the anthropometer arm firmly in contact with the highest point in the crotch.

PERCENTILES

CENTIMETERS		INCHES
94.54	99 TH	37.22
93.09	98 TH	36.65
92.19	97 TH	36.29
90.97	95 TH	35.81
89.13	90 TH	35.09
87.92	85 TH	34.61
86.98	80 TH	34.24
86.18	75 TH	33.93
85.48	70 TH	33.65
84.83	65 TH	33.40
84.23	60 TH	33.16
83.65	55 TH	32.93
83.08	50 TH	32.71
82.52	45 TH	32.49
81.95	40 TH	32.26
81.37	35 TH	32.04
80.76	30 TH	31.80
80.10	25 TH	31.54
79.37	20 TH	31.25
78.52	15 TH	30.91
77.44	10 TH	30.49
75.81	5 TH	29.85
74.72	3 RD	29.42
73.91	2 ND	29.10
72.58	1 ST	28.57

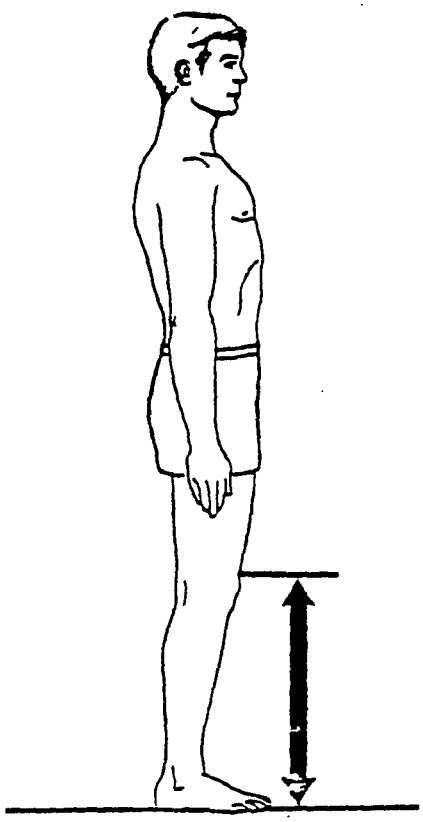
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
83.17	MEAN	32.74
0.07	SE(M)	0.03
4.59	ST DEV	1.81
0.05	SE(SD)	0.02

SYMMETRY--BETA I = 0.11
KURTOSIS--BETA II = 3.19
COEFFICIENT OF VARIATION = 5.51

SAMPLE SIZE = 4095

Table E-8 PATELLA HEIGHT-TOP



Kneecap Height (Patella Height): Subject stands erect, with heels together. Kneecap height is measured as the vertical distance from the floor (or standing surface) to the upper edge of the right kneecap (patella). An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
60.44	99 TH	23.79
59.58	98 TH	23.46
59.02	97 TH	23.23
58.22	95 TH	22.92
56.98	90 TH	22.43
56.14	85 TH	22.10
55.48	80 TH	21.84
54.92	75 TH	21.62
54.42	70 TH	21.43
53.97	65 TH	21.25
53.54	60 TH	21.08
53.14	55 TH	20.92
52.74	50 TH	20.77
52.36	45 TH	20.61
51.97	40 TH	20.46
51.58	35 TH	20.31
51.17	30 TH	20.14
50.73	25 TH	19.97
50.25	20 TH	19.78
49.70	15 TH	19.57
49.00	10 TH	19.29
47.97	5 TH	18.89
47.28	3 RD	18.61
46.75	2 ND	18.41
45.88	1 ST	18.06

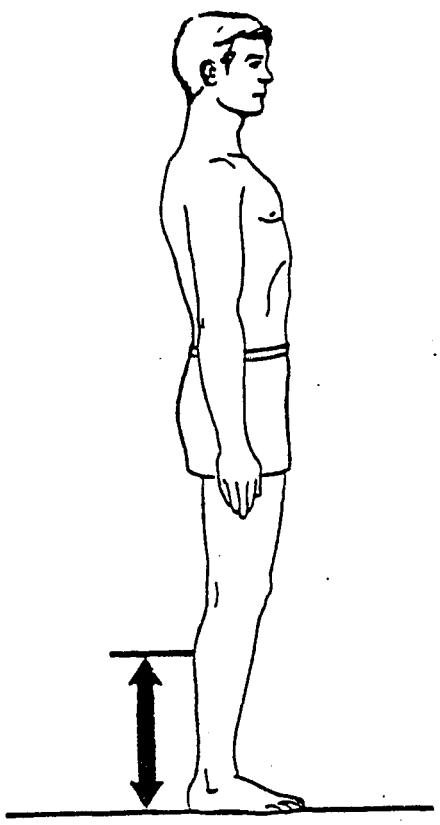
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
52.87	MEAN	20.81
0.05	SE(M)	0.02
3.08	ST DEV	1.21
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.19
KURTOSIS--BETA II = 3.06
COEFFICIENT OF VARIATION = 5.83

SAMPLE SIZE = 4095

Table E-9 CALF HEIGHT



Calf Height: Subject stands erect, with heels together. Calf height is measured as the vertical distance from the floor (or standing surface) to the level of the greatest bulge of the right calf muscle. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
42.53	99 TH	16.74
41.66	98 TH	16.40
41.14	97 TH	16.20
40.47	95 TH	15.93
39.47	90 TH	15.54
38.82	85 TH	15.28
38.31	80 TH	15.08
37.88	75 TH	14.91
37.49	70 TH	14.76
37.12	65 TH	14.62
36.78	60 TH	14.48
36.45	55 TH	14.35
36.11	50 TH	14.22
35.78	45 TH	14.09
35.44	40 TH	13.95
35.08	35 TH	13.81
34.71	30 TH	13.66
34.30	25 TH	13.50
33.84	20 TH	13.32
33.31	15 TH	13.11
32.63	10 TH	12.85
31.64	5 TH	12.46
31.01	3 RD	12.21
30.56	2 ND	12.03
29.89	1 ST	11.77

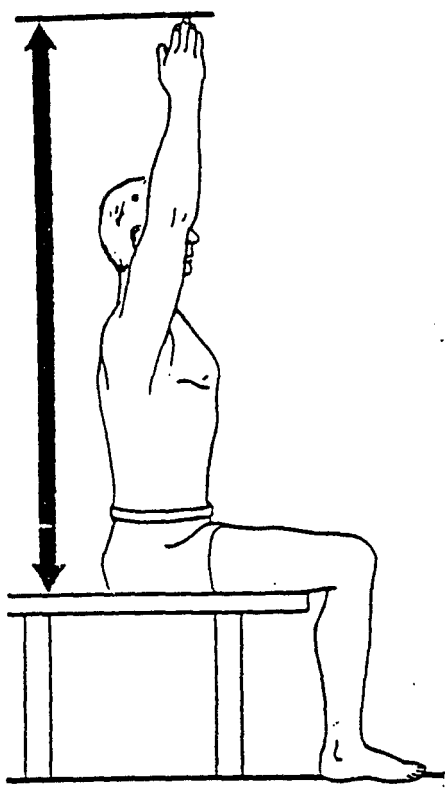
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
36.11	MEAN	14.22
0.04	SE(M)	0.02
2.67	ST DEV	1.05
0.03	SE(SD)	0.01

SYMMETRY--BETA I = -0.03
KURTOSIS--BETA II = 3.07
COEFFICIENT OF VARIATION = 7.38

SAMPLE SIZE = 4094

Table E-10 VERTICAL REACH/SIT



Vertical Arm Reach, Sitting: Subject sits erect, with his right arm and hand extended vertically above his shoulder. Arm reach is measured as the vertical distance from the sitting surface to the tip of the middle finger of the extended hand. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
153.03	99 TH	60.25
151.06	98 TH	59.47
149.88	97 TH	59.01
148.33	95 TH	58.40
146.07	90 TH	57.51
144.61	85 TH	56.93
143.47	80 TH	56.49
142.50	75 TH	56.10
141.64	70 TH	55.77
140.86	65 TH	55.45
140.11	60 TH	55.16
139.39	55 TH	54.88
138.68	50 TH	54.60
137.97	45 TH	54.32
137.25	40 TH	54.04
136.51	35 TH	53.74
135.73	30 TH	53.44
134.88	25 TH	53.10
133.93	20 TH	52.73
132.84	15 TH	52.30
131.46	10 TH	51.76
129.45	5 TH	50.97
128.18	3 RD	50.46
127.26	2 ND	50.10
125.87	1 ST	49.55

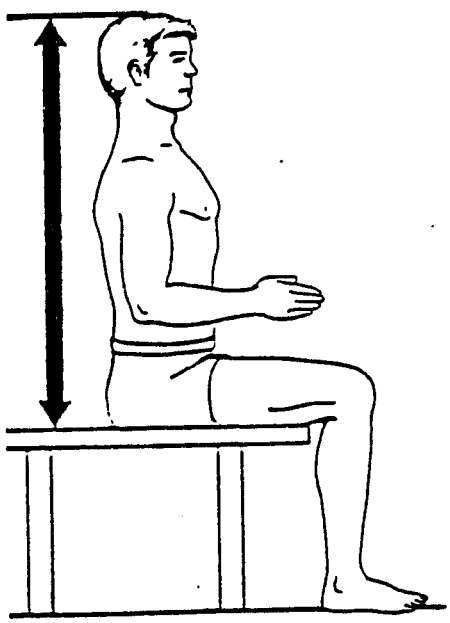
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
138.73	MEAN	54.62
0.09	SE(M)	0.04
5.72	ST DEV	2.25
0.06	SE(SD)	0.02

SYMMETRY--BETA I = 0.14
KURTOSIS--BETA II = 3.25
COEFFICIENT OF VARIATION = 4.12

SAMPLE SIZE = 4095

Table E-11 SITTING HEIGHT



Sitting Height: Subject sits erect, with head level, and with his feet resting on a surface adjusted so that his knees are bent at right angles. Sitting height is measured as the vertical distance from the sitting surface to the top of the head (vertex). An anthropometer is used, with the anthropometer arm firmly touching the scalp to compress the hair.

PERCENTILES

CENTIMETERS		INCHES
99.66	99 TH	39.24
98.80	98 TH	38.90
98.21	97 TH	38.67
97.40	95 TH	38.35
96.10	90 TH	37.83
95.21	85 TH	37.48
94.50	80 TH	37.21
93.90	75 TH	36.97
93.36	70 TH	36.76
92.87	65 TH	36.56
92.40	60 TH	36.38
91.96	55 TH	36.20
91.52	50 TH	36.03
91.09	45 TH	35.86
90.65	40 TH	35.69
90.21	35 TH	35.51
89.74	30 TH	35.33
89.24	25 TH	35.13
88.69	20 TH	34.92
88.05	15 TH	34.66
87.24	10 TH	34.35
86.02	5 TH	33.87
85.20	3 RD	33.54
84.58	2 ND	33.30
83.56	1 ST	32.90

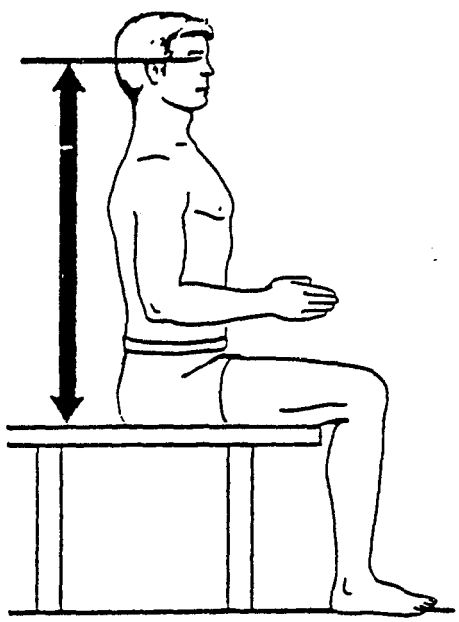
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
91.60	MEAN	36.06
0.05	SE(M)	0.02
3.43	ST DEV	1.35
0.04	SE(SD)	0.01

SYMMETRY--BETA I = 0.08
KURTOSIS--BETA II = 3.04
COEFFICIENT OF VARIATION = 3.74

SAMPLE SIZE = 4095

Table E- 12 EYE HEIGHT/SITTING



Eye Height, Sitting: Subject sits erect, with head level, and with his feet resting on a surface adjusted so that his knees are bent at right angles. Eye height is measured as the vertical distance from the sitting surface to the inner corner (internal canthus) of the right eye. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
87.34	99 TH	34.39
86.53	98 TH	34.07
86.00	97 TH	33.86
85.24	95 TH	33.56
84.05	90 TH	33.09
83.23	85 TH	32.77
82.59	80 TH	32.51
82.03	75 TH	32.29
81.53	70 TH	32.10
81.07	65 TH	31.92
80.64	60 TH	31.75
80.23	55 TH	31.59
79.82	50 TH	31.43
79.42	45 TH	31.27
79.01	40 TH	31.11
78.60	35 TH	30.94
78.16	30 TH	30.77
77.69	25 TH	30.59
77.18	20 TH	30.38
76.58	15 TH	30.15
75.84	10 TH	29.86
74.73	5 TH	29.42
74.00	3 RD	29.23
73.45	2 ND	28.92
72.58	1 ST	28.57

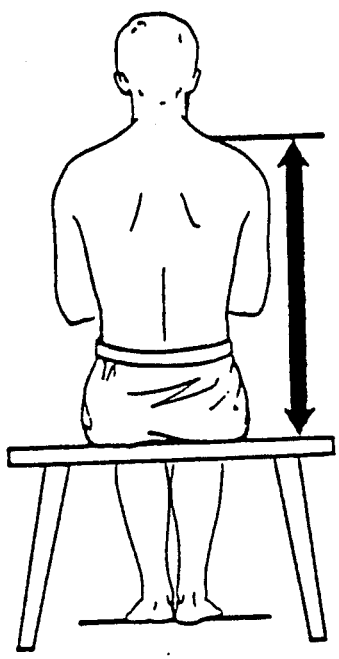
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
79.88	MEAN	31.45
0.05	SE(M)	0.02
3.17	ST DEV	1.25
0.04	SE(SD)	0.01

SYMMETRY--BETA I = 0.07
KURTOSIS--BETA II = 2.99
COEFFICIENT OF VARIATION = 3.96

SAMPLE SIZE = 4095

Table E- 13 MID-SHOULDER HT/S



Mid-Shoulder Height, Sitting: Subject sits erect, with head level, and with his hands resting on his thighs. Mid-shoulder height is measured as the vertical distance from the sitting surface to the top of the right shoulder, midway between the neck and the outer point (acromion) of the shoulder. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
69.89	99 TH	27.52
69.05	98 TH	27.19
68.51	97 TH	26.97
67.77	95 TH	26.68
66.62	90 TH	26.23
65.85	85 TH	25.92
65.24	80 TH	25.69
64.72	75 TH	25.48
64.26	70 TH	25.30
63.84	65 TH	25.13
63.45	60 TH	24.98
63.07	55 TH	24.83
62.69	50 TH	24.68
62.32	45 TH	24.53
61.94	40 TH	24.39
61.56	35 TH	24.24
61.15	30 TH	24.08
60.71	25 TH	23.90
60.22	20 TH	23.71
59.65	15 TH	23.48
58.92	10 TH	23.20
57.80	5 TH	22.76
57.05	3 RD	22.46
56.47	2 ND	22.23
55.52	1 ST	21.86

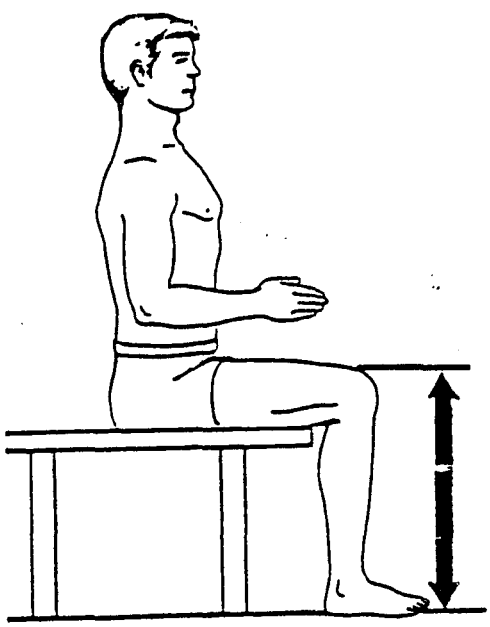
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
62.71	MEAN	24.69
0.05	SE(M)	0.02
3.01	ST DEV	1.18
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.05
KURTOSIS--BETA II = 3.10
COEFFICIENT OF VARIATION = 4.79

SAMPLE SIZE = 4095

Table E-14 KNEE HEIGHT/SITING



Knee Height, Sitting: Subject sits erect, with his feet resting on a surface adjusted so that his knees are bent at right angles. Knee height is measured as the vertical distance from the footrest surface to the top of the right knee. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
60.14	99 TH	23.68
59.34	98 TH	23.36
58.83	97 TH	23.16
58.15	95 TH	22.89
57.11	90 TH	22.48
56.41	85 TH	22.21
55.87	80 TH	22.00
55.41	75 TH	21.81
55.00	70 TH	21.65
54.62	65 TH	21.50
54.27	60 TH	21.36
53.93	55 TH	21.23
53.59	50 TH	21.10
53.26	45 TH	20.97
52.93	40 TH	20.84
52.59	35 TH	20.70
52.23	30 TH	20.56
51.85	25 TH	20.41
51.42	20 TH	20.25
50.94	15 TH	20.05
50.33	10 TH	19.82
49.45	5 TH	19.47
48.89	3 RD	19.25
48.48	2 ND	19.09
47.84	1 ST	18.84

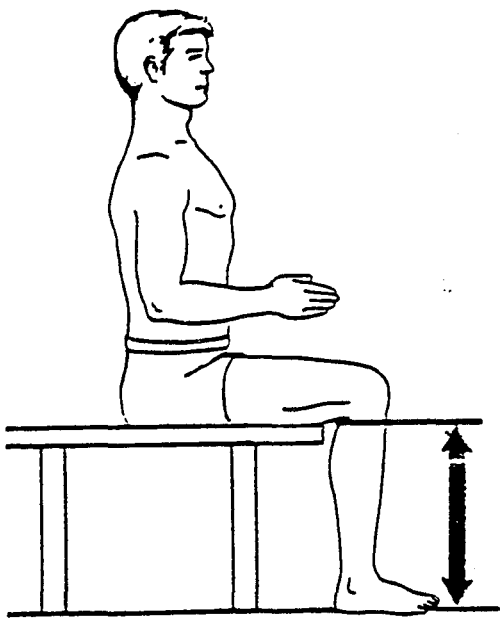
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
53.68	MEAN	21.13
0.04	SE(M)	0.02
2.64	ST DEV	1.04
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.17
KURTOSIS--BETA II = 3.16
COEFFICIENT OF VARIATION = 4.92

SAMPLE SIZE = 4095

Table E-15 POPLITEAL HEIGHT



Popliteal Height, Sitting: Subject sits erect, with his feet resting on a surface adjusted so that his knees are bent at right angles. Popliteal height is measured as the vertical distance from the footrest surface to the underside of the right knee (popliteal area). An anthropometer is used.

PERCENTILES

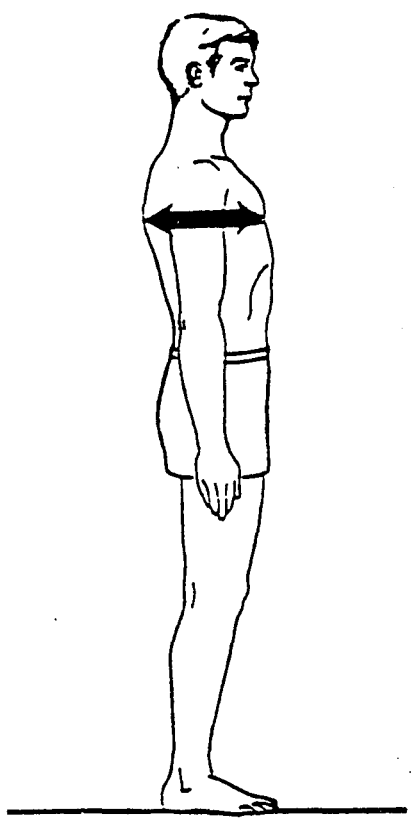
CENTIMETERS		INCHES
49.54	99 TH	19.51
48.84	98 TH	19.23
48.41	97 TH	19.06
47.84	95 TH	18.84
46.98	90 TH	18.50
46.40	85 TH	18.27
45.93	80 TH	18.08
45.52	75 TH	17.92
45.14	70 TH	17.77
44.79	65 TH	17.63
44.45	60 TH	17.50
44.12	55 TH	17.37
43.79	50 TH	17.24
43.46	45 TH	17.11
43.12	40 TH	16.98
42.76	35 TH	16.84
42.39	30 TH	16.69
41.98	25 TH	16.53
41.53	20 TH	16.35
41.02	15 TH	16.15
40.38	10 TH	15.90
39.51	5 TH	15.56
39.01	3 RD	15.36
38.69	2 ND	15.23
38.27	1 ST	15.07

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
43.75	MEAN	17.22
0.04	SE(M)	0.02
2.52	ST DEV	0.99
0.03	SE(SD)	0.01

SYMMETRY--BETA I =	0.00
KURTOSIS--BETA II =	2.74
COEFFICIENT OF VARIATION =	5.76
SAMPLE SIZE =	4095

Table E-16 CHEST DEPTH



Chest Depth: Subject stands erect, with his arms initially raised and then lowered after the anthropometer is in place under the right arm. The depth of the chest is measured at the level of the nipples during normal breathing. An anthropometer is used, and is held horizontally.

PERCENTILES

CENTIMETERS		INCHES
27.85	99 TH	10.96
27.19	98 TH	10.71
26.77	97 TH	10.54
26.21	95 TH	10.32
25.34	90 TH	9.98
24.78	85 TH	9.76
24.35	80 TH	9.59
23.98	75 TH	9.44
23.67	70 TH	9.32
23.38	65 TH	9.21
23.12	60 TH	9.10
22.87	55 TH	9.01
22.64	50 TH	8.91
22.40	45 TH	8.82
22.17	40 TH	8.73
21.94	35 TH	8.64
21.71	30 TH	8.55
21.46	25 TH	8.45
21.19	20 TH	8.34
20.88	15 TH	8.22
20.50	10 TH	8.07
19.95	5 TH	7.85
19.59	3 RD	7.71
19.32	2 ND	7.60
18.87	1 ST	7.43

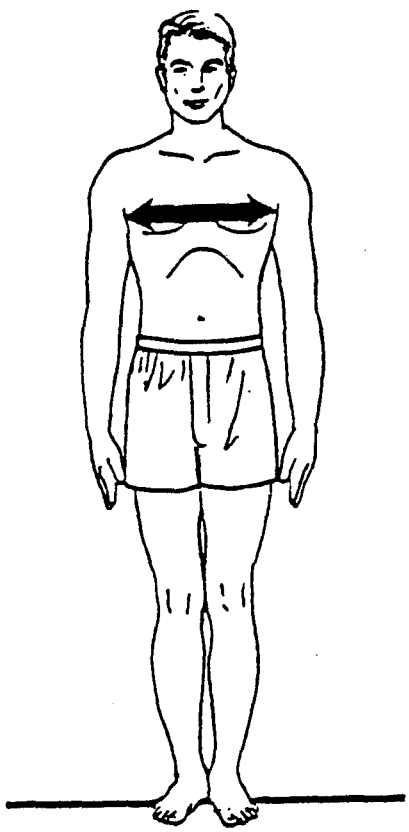
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
22.79	MEAN	8.97
0.03	SE(M)	0.01
1.90	ST DEV	0.75
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.43
KURTOSIS--BETA II = 3.28
COEFFICIENT OF VARIATION = 8.32

SAMPLE SIZE = 4095

Table E-17 CHEST BREADTH/SKIN



Chest Breadth: Subject stands erect, with his arms initially raised and then lowered after the anthropometer is in place. The breadth of the chest is measured at the level of the nipples during normal breathing. An anthropometer is used, and is held horizontally.

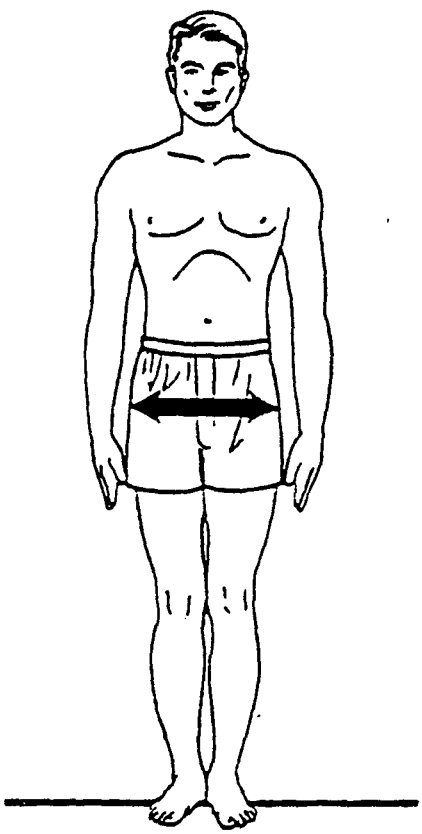
PERCENTILES

CENTIMETERS		INCHES
35.73	99 TH	14.07
34.91	98 TH	13.74
34.42	97 TH	13.55
33.79	95 TH	13.30
32.88	90 TH	12.94
32.29	85 TH	12.71
31.85	80 TH	12.54
31.47	75 TH	12.39
31.14	70 TH	12.26
30.84	65 TH	12.14
30.57	60 TH	12.03
30.30	55 TH	11.93
30.04	50 TH	11.83
29.78	45 TH	11.72
29.52	40 TH	11.62
29.26	35 TH	11.52
28.99	30 TH	11.41
28.70	25 TH	11.30
28.38	20 TH	11.17
28.01	15 TH	11.03
27.57	10 TH	10.85
26.94	5 TH	10.61
26.56	3 RD	10.46
26.30	2 ND	10.35
25.92	1 ST	10.21

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
30.16	MEAN	11.87
0.03	SE(M)	0.01
2.06	ST DEV	0.81
0.02	SE(SD)	0.01
SYMMETRY--BETA I =		0.40
KURTOSIS--BETA II =		3.35
COEFFICIENT OF VARIATION =		6.82
SAMPLE SIZE =		4095

Table E-18 HIP BREADTH



Hip Breadth, Standing: Subject stands erect, with heels together. The maximum breadth across the hips is measured. An anthropometer is used, and is held horizontally.

PERCENTILES

CENTIMETERS		INCHES
38.53	99 TH	15.17
37.80	98 TH	14.88
37.34	97 TH	14.70
36.72	95 TH	14.46
35.80	90 TH	14.09
35.19	85 TH	13.86
34.73	80 TH	13.67
34.34	75 TH	13.52
34.00	70 TH	13.39
33.70	65 TH	13.27
33.42	60 TH	13.16
33.15	55 TH	13.05
32.89	50 TH	12.95
32.64	45 TH	12.85
32.39	40 TH	12.75
32.14	35 TH	12.65
31.89	30 TH	12.55
31.62	25 TH	12.45
31.32	20 TH	12.33
30.99	15 TH	12.20
30.59	10 TH	12.04
30.01	5 TH	11.81
29.64	3 RD	11.67
29.36	2 ND	11.56
28.93	1 ST	11.39

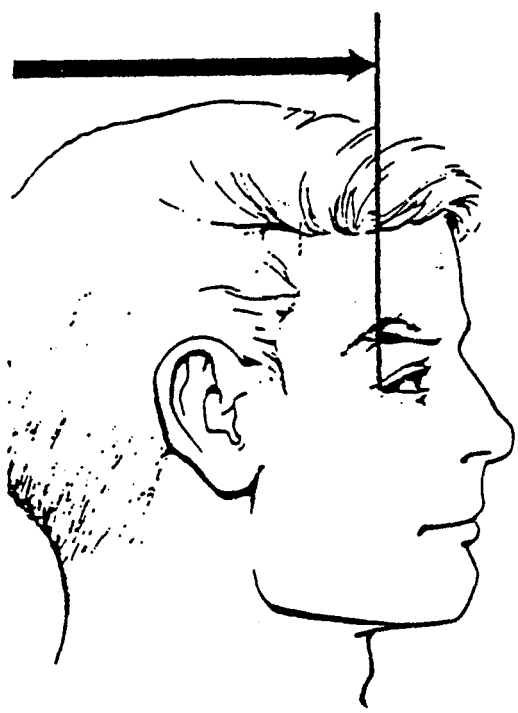
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
33.07	MEAN	13.02
0.03	SE(M)	0.01
2.04	ST DEV	0.80
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.45
KURTOSIS--BETA II = 3.29
COEFFICIENT OF VARIATION = 6.17

SAMPLE SIZE = 4094

Table E-19 OCCIPUT-EX CANTHUS



Occiput-External Canthus: Subject sits erect, with head level. The distance from the back of the head (occiput) to the outer corner (external canthus) of the right eye is measured. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
19.53	99 TH	7.69
19.34	98 TH	7.61
19.20	97 TH	7.56
18.98	95 TH	7.47
18.62	90 TH	7.33
18.36	85 TH	7.23
18.14	80 TH	7.14
17.95	75 TH	7.07
17.78	70 TH	7.00
17.62	65 TH	6.94
17.46	60 TH	6.88
17.31	55 TH	6.82
17.17	50 TH	6.76
17.02	45 TH	6.70
16.87	40 TH	6.64
16.72	35 TH	6.58
16.57	30 TH	6.52
16.40	25 TH	6.46
16.22	20 TH	6.39
16.02	15 TH	6.31
15.78	10 TH	6.21
15.47	5 TH	6.09
15.28	3 RD	6.02
15.16	2 ND	5.97
15.00	1 ST	5.91

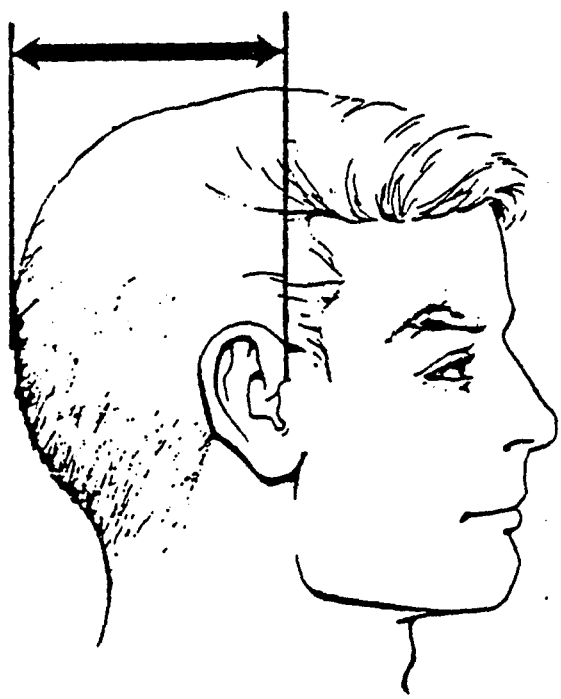
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
17.19	MEAN	6.77
0.02	SE(M)	0.01
1.06	ST DEV	0.42
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.08
KURTOSIS--BETA II = 2.40
COEFFICIENT OF VARIATION = 6.17

SAMPLE SIZE = 4095

Table E-20 OCCIPUT-TRAGION



Occiput-Tragion: Subject sits erect, with head level. The distance from the back of the head (occiput) to the cartilaginous notch (tragion) at the front of the right ear is measured. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
13.21	99 TH	5.20
13.01	98 TH	5.12
12.86	97 TH	5.06
12.63	95 TH	4.97
12.26	90 TH	4.82
12.00	85 TH	4.72
11.80	80 TH	4.65
11.62	75 TH	4.58
11.42	70 TH	4.50
11.22	65 TH	4.42
10.94	60 TH	4.31
10.63	55 TH	4.19
10.34	50 TH	4.07
10.07	45 TH	3.97
9.85	40 TH	3.88
9.67	35 TH	3.81
9.50	30 TH	3.74
9.34	25 TH	3.68
9.18	20 TH	3.61
8.99	15 TH	3.54
8.79	10 TH	3.46
8.45	5 TH	3.33
8.25	3 RD	3.25
8.09	2 ND	3.18
7.89	1 ST	3.11

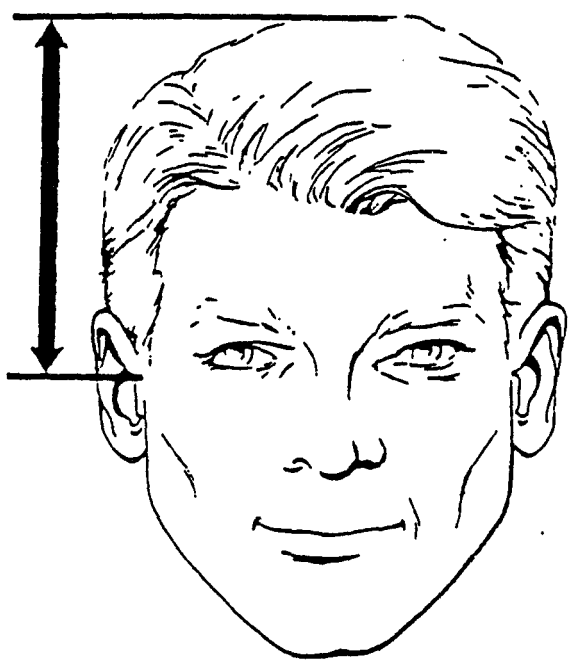
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
10.46	MEAN	4.12
0.02	SE(M)	0.01
1.34	ST DEV	0.53
0.01	SE(SD)	0.01

SYMMETRY--BETA I = 0.14
KURTOSIS--BETA II = 2.06
COEFFICIENT OF VARIATION = 12.84

SAMPLE SIZE = 4095

Table E-21 HEAD HEIGHT



Head Height (Tragion-Vertex Height): Subject sits erect, with head level. Head height is measured as the vertical distance from the cartilaginous notch (tragion) at the front of the right ear to the top of the head (vertex). An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
15.39	99 TH	6.06
15.21	98 TH	5.99
15.09	97 TH	5.94
14.92	95 TH	5.88
14.65	90 TH	5.77
14.45	85 TH	5.69
14.29	80 TH	5.63
14.15	75 TH	5.57
14.02	70 TH	5.52
13.90	65 TH	5.47
13.78	60 TH	5.43
13.67	55 TH	5.38
13.55	50 TH	5.34
13.44	45 TH	5.29
13.32	40 TH	5.25
13.20	35 TH	5.20
13.08	30 TH	5.15
12.94	25 TH	5.09
12.79	20 TH	5.03
12.61	15 TH	4.97
12.39	10 TH	4.88
12.09	5 TH	4.76
11.90	3 RD	4.69
11.77	2 ND	4.63
11.58	1 ST	4.56

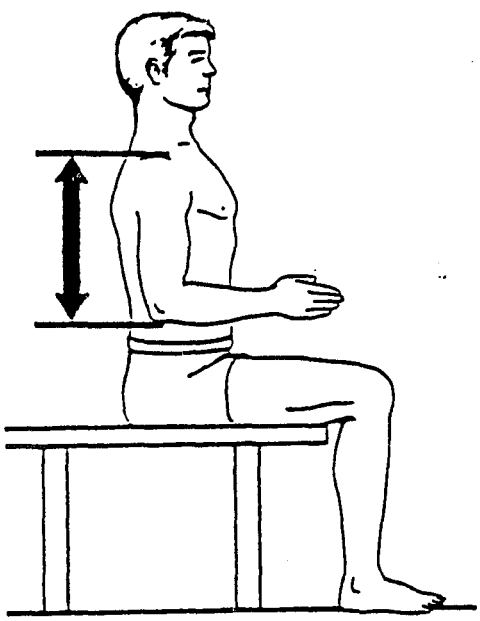
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
13.54	MEAN	5.33
0.01	SE(M)	0.01
0.85	ST DEV	0.34
0.01	SE(SD)	0.00

SYMMETRY--BETA I = -0.09
KURTUSIS--BETA II = 2.65
COEFFICIENT OF VARIATION = 6.30

SAMPLE SIZE = 4095

Table E-22 SHOULDER-ELBOW LTH



Shoulder-Elbow Length: Subject sits erect, with his arms bent to form right angles at the elbows. Shoulder-elbow length is measured as the vertical distance from the outer point (acromion) of the right shoulder to the bottom of the right elbow. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
41.33	99 TH	16.27
40.77	98 TH	16.05
40.42	97 TH	15.91
39.95	95 TH	15.73
39.25	90 TH	15.45
38.79	85 TH	15.27
38.42	80 TH	15.13
38.11	75 TH	15.00
37.83	70 TH	14.89
37.57	65 TH	14.79
37.33	60 TH	14.70
37.09	55 TH	14.60
36.86	50 TH	14.51
36.63	45 TH	14.42
36.39	40 TH	14.33
36.15	35 TH	14.23
35.89	30 TH	14.13
35.62	25 TH	14.02
35.31	20 TH	13.90
34.95	15 TH	13.76
34.51	10 TH	13.58
33.85	5 TH	13.33
33.43	3 RD	13.16
33.13	2 ND	13.04
32.66	1 ST	12.86

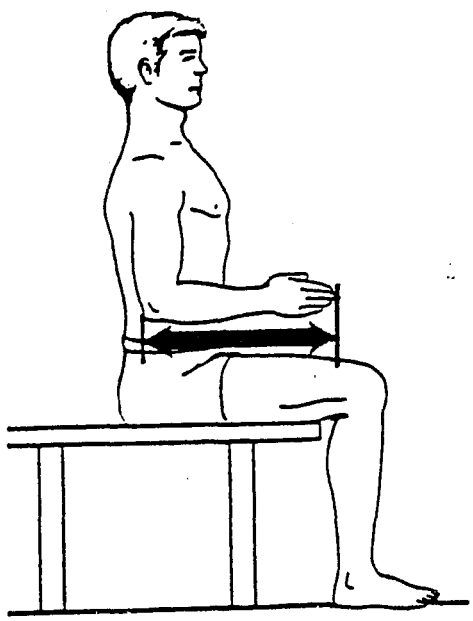
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
36.87	MEAN	14.52
0.03	SE(M)	0.01
1.83	ST DEV	0.72
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.04
KURTOSIS--BETA II = 2.97
COEFFICIENT OF VARIATION = 4.97

SAMPLE SIZE = 4095

Table E- 23 FOREARM-HAND LTH



Elbow-Fingertip Length (Forearm-Hand Length): Subject sits erect, with his arms bent to form right angles at the elbows and with his hands extended. Elbow-fingertip length is measured as the horizontal distance from the back of the right elbow to the tip of the middle finger of the extended right hand. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
53.12	99 TH	20.91
52.36	98 TH	20.62
51.91	97 TH	20.44
51.31	95 TH	20.20
50.44	90 TH	19.86
49.88	85 TH	19.64
49.44	80 TH	19.46
49.07	75 TH	19.32
48.74	70 TH	19.19
48.44	65 TH	19.07
48.16	60 TH	18.96
47.88	55 TH	18.85
47.61	50 TH	18.75
47.35	45 TH	18.64
47.08	40 TH	18.53
46.80	35 TH	18.42
46.51	30 TH	18.31
46.19	25 TH	18.18
45.84	20 TH	18.05
45.44	15 TH	17.89
44.93	10 TH	17.69
44.20	5 TH	17.40
43.75	3 RD	17.22
43.43	2 ND	17.10
42.95	1 ST	16.91

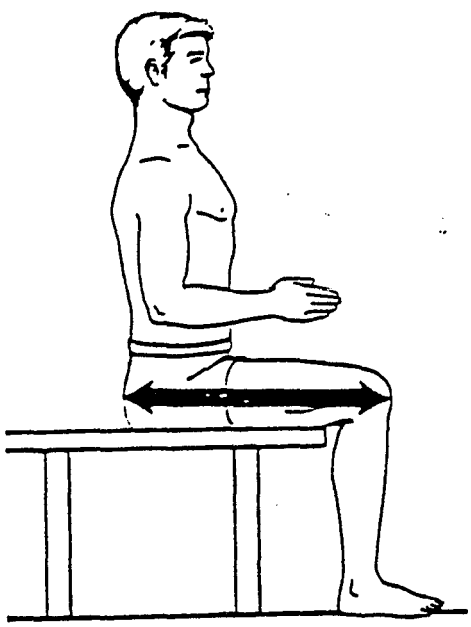
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
47.66	MEAN	18.76
0.03	SE(M)	0.01
2.14	ST DEV	0.84
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.16
KURTUSIS--BETA II = 3.08
COEFFICIENT OF VARIATION = 4.48

SAMPLE SIZE = 4095

Table E-24 BUTTOCK-KNEE LTH



Buttock-Knee Length: Subject sits erect, with his feet resting on a surface adjusted so that his knees are bent at right angles. Buttock-knee length is measured as the horizontal distance from the back of the right buttock to the front of the right knee. An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
65.91	99 TH	25.95
65.03	98 TH	25.60
64.49	97 TH	25.39
63.78	95 TH	25.11
62.73	90 TH	24.70
62.03	85 TH	24.42
61.49	80 TH	24.21
61.03	75 TH	24.03
60.62	70 TH	23.87
60.24	65 TH	23.72
59.88	60 TH	23.57
59.53	55 TH	23.44
59.18	50 TH	23.30
58.84	45 TH	23.17
58.49	40 TH	23.03
58.13	35 TH	22.89
57.75	30 TH	22.74
57.34	25 TH	22.58
56.88	20 TH	22.40
56.36	15 TH	22.19
55.70	10 TH	21.93
54.74	5 TH	21.55
54.13	3 RD	21.31
53.71	2 ND	21.14
53.06	1 ST	20.89

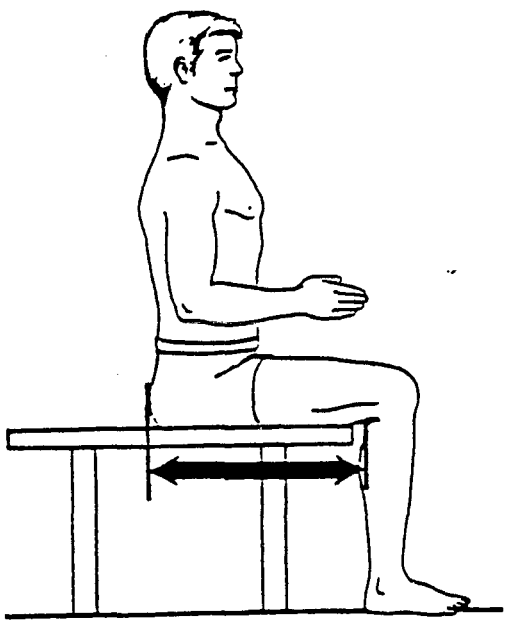
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
59.21	MEAN	23.31
0.04	SE(M)	0.02
2.74	ST DEV	1.08
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.11
KURTOSIS--BETA II = 3.12
COEFFICIENT OF VARIATION = 4.63

SAMPLE SIZE = 4095

Table E-25 BUTTOCK-POPLITEAL



Buttock-Popliteal Length: Subject sits erect, with his feet resting on a surface adjusted so that his knees are bent at right angles. Buttock-popliteal length is measured as the horizontal distance from the back of the right buttock to the back of the right knee (popliteal area). An anthropometer is used.

PERCENTILES

CENTIMETERS		INCHES
54.63	99 TH	21.51
53.93	98 TH	21.23
53.49	97 TH	21.06
52.90	95 TH	20.83
51.99	90 TH	20.47
51.38	85 TH	20.23
50.91	80 TH	20.04
50.50	75 TH	19.88
50.14	70 TH	19.74
49.81	65 TH	19.61
49.49	60 TH	19.49
49.19	55 TH	19.37
48.89	50 TH	19.25
48.60	45 TH	19.13
48.30	40 TH	19.02
48.00	35 TH	18.90
47.68	30 TH	18.77
47.33	25 TH	18.63
46.95	20 TH	18.48
46.51	15 TH	18.31
45.97	10 TH	18.10
45.18	5 TH	17.79
44.67	3 RD	17.59
44.31	2 ND	17.44
43.74	1 ST	17.22

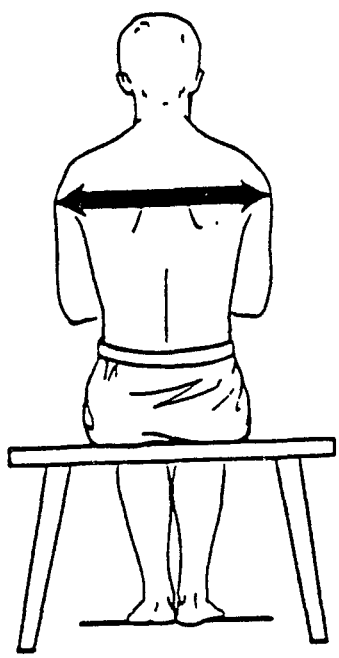
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
48.95	MEAN	19.27
0.04	SE(M)	0.01
2.34	ST DEV	0.92
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.16
KURTOSIS--BETA II = 3.12
COEFFICIENT OF VARIATION = 4.78

SAMPLE SIZE = 4095

Table E-26 BIDELTOID DIAMETER



Shoulder Breadth (Bideltoid Breadth): Subject sits erect, with his arms bent to form right angles at the elbows and with his elbows held against the body. The maximum breadth across the shoulders is measured at the level of the bulges of the deltoid muscles in the upper arms. An anthropometer is used, and is held horizontally.

PERCENTILES

CENTIMETERS		INCHES
51.38	99 TH	20.23
50.60	98 TH	19.92
50.10	97 TH	19.72
49.41	95 TH	19.45
48.34	90 TH	19.03
47.63	85 TH	18.75
47.08	80 TH	18.53
46.61	75 TH	18.35
46.19	70 TH	18.19
45.82	65 TH	18.04
45.47	60 TH	17.90
45.13	55 TH	17.77
44.81	50 TH	17.64
44.49	45 TH	17.52
44.17	40 TH	17.39
43.85	35 TH	17.26
43.51	30 TH	17.13
43.15	25 TH	16.99
42.76	20 TH	16.83
42.30	15 TH	16.66
41.74	10 TH	16.43
40.89	5 TH	16.10
40.32	3 RD	15.88
39.90	2 ND	15.71
39.19	1 ST	15.43

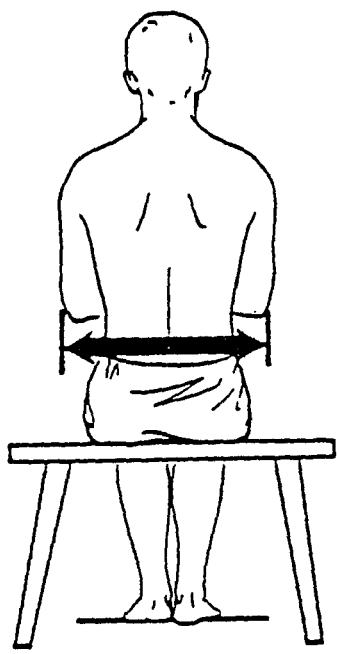
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
44.93	MEAN	17.69
0.04	SE(M)	0.02
2.57	ST DEV	1.01
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.25
KURTOSIS--BETA II = 3.12
COEFFICIENT OF VARIATION = 5.72

SAMPLE SIZE = 4095

Table E-27 MAX F"ARM-F"ARM BR



Forearm-Forearm Breadth (Elbow-To-Elbow Breadth): Subject sits erect, with his arms bent to form right angles at the elbows and with his elbows held against the body. The maximum breadth across the body is measured, including the arms at the level of the forearm muscles. An anthropometer is used, and is held horizontally.

PERCENTILES

CENTIMETERS		INCHES
57.86	99 TH	22.78
56.33	98 TH	22.18
55.33	97 TH	21.78
53.94	95 TH	21.24
51.80	90 TH	20.39
50.38	85 TH	19.84
49.29	80 TH	19.41
48.37	75 TH	19.05
47.58	70 TH	18.73
46.86	65 TH	18.45
46.21	60 TH	18.19
45.59	55 TH	17.95
45.00	50 TH	17.72
44.44	45 TH	17.49
43.88	40 TH	17.28
43.33	35 TH	17.06
42.77	30 TH	16.84
42.20	25 TH	16.61
41.58	20 TH	16.37
40.90	15 TH	16.10
40.10	10 TH	15.79
38.97	5 TH	15.34
38.26	3 RD	15.06
37.73	2 ND	14.86
36.88	1 ST	14.52

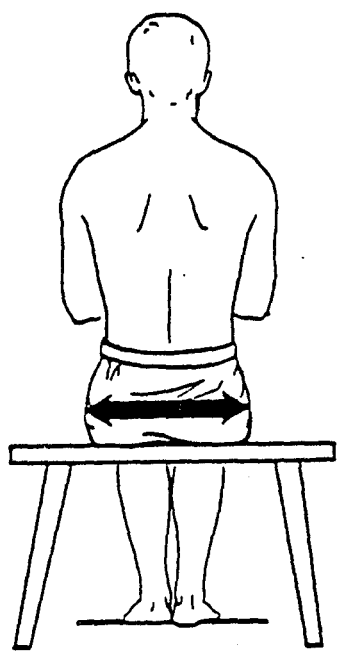
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
45.53	MEAN	17.93
0.07	SE(M)	0.03
4.57	ST DEV	1.80
0.05	SE(SD)	0.02

SYMMETRY--BETA I = 0.57
KURTOSIS--BETA II = 3.18
COEFFICIENT OF VARIATION = 10.03

SAMPLE SIZE = 4094

Table E-28 HIP BREADTH/SITING



Hip Breadth, Sitting: Subject sits erect, with knees together. The maximum breadth across the hips is measured. An anthropometer is used, and is held horizontally.

PERCENTILES

CENTIMETERS		INCHES
40.30	99 TH	15.87
39.48	98 TH	15.54
38.94	97 TH	15.33
38.19	95 TH	15.04
37.06	90 TH	14.59
36.32	85 TH	14.30
35.76	80 TH	14.08
35.28	75 TH	13.89
34.87	70 TH	13.73
34.51	65 TH	13.59
34.17	60 TH	13.45
33.86	55 TH	13.33
33.57	50 TH	13.21
33.28	45 TH	13.10
33.00	40 TH	12.99
32.72	35 TH	12.88
32.44	30 TH	12.77
32.15	25 TH	12.66
31.84	20 TH	12.54
31.50	15 TH	12.40
31.08	10 TH	12.24
30.48	5 TH	12.00
30.08	3 RD	11.84
29.78	2 ND	11.72
29.26	1 ST	11.52

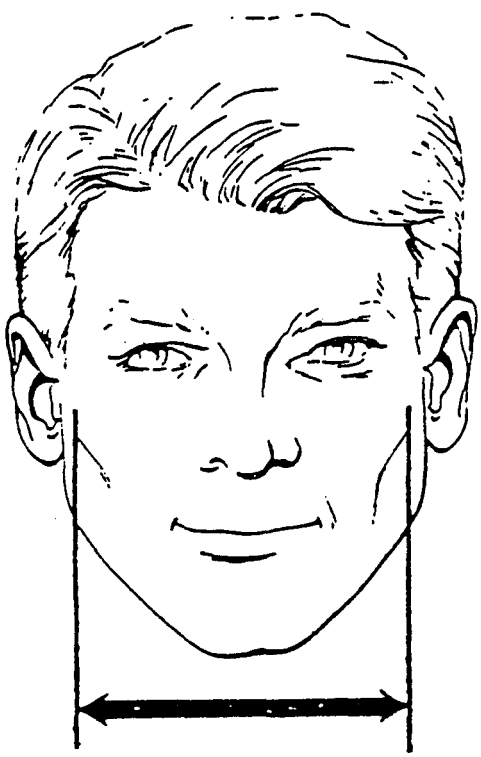
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
33.85	MEAN	13.33
0.04	SE(M)	0.01
2.36	ST DEV	0.93
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.61
KURTOSIS--BETA II = 3.48
COEFFICIENT OF VARIATION = 6.97

SAMPLE SIZE = 4094

Table E-29 BIZYGOMATIC DIAM



Face Breadth (Bizygomatic Breadth): Subject sits erect, with head level. The maximum horizontal breadth of the face is measured between the lateral projections of the cheek bones (zygomatic arches). Spreading calipers are used.

PERCENTILES

CENTIMETERS		INCHES
15.33	99 TH	6.04
15.15	98 TH	5.96
15.03	97 TH	5.92
14.88	95 TH	5.86
14.65	90 TH	5.77
14.51	85 TH	5.71
14.39	80 TH	5.67
14.30	75 TH	5.63
14.21	70 TH	5.59
14.13	65 TH	5.56
14.06	60 TH	5.54
13.99	55 TH	5.51
13.92	50 TH	5.48
13.86	45 TH	5.45
13.79	40 TH	5.43
13.72	35 TH	5.40
13.64	30 TH	5.37
13.56	25 TH	5.34
13.48	20 TH	5.31
13.37	15 TH	5.27
13.24	10 TH	5.21
13.05	5 TH	5.14
12.92	3 RD	5.09
12.82	2 ND	5.05
12.66	1 ST	4.98

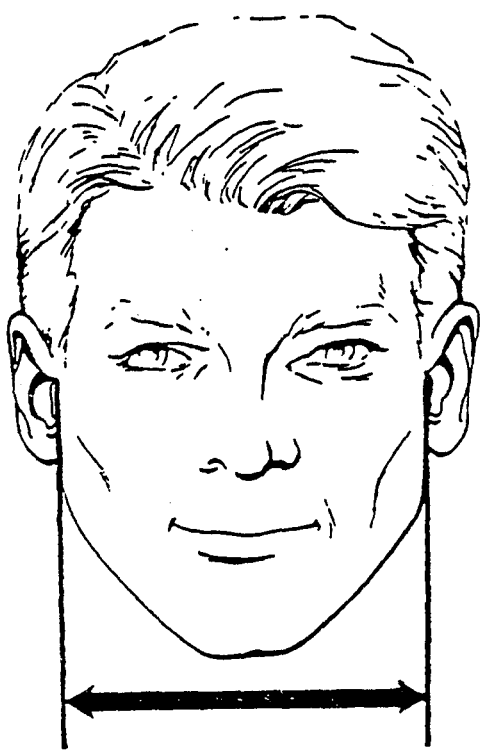
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
13.94	MEAN	5.49
0.01	SE(M)	0.00
0.55	ST DEV	0.22
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.18
KURTOSIS--BETA II = 3.28
COEFFICIENT OF VARIATION = 3.95

SAMPLE SIZE = 4095

Table E-30 BITRAGION DIAMETER



Bitragion Breadth: Subject sits erect, with head level. The horizontal breadth of the head is measured from the right tragion (the cartilaginous notch at the front of the right ear) to the corresponding tragion of the left ear. Spreading calipers are used.

PERCENTILES

CENTIMETERS		INCHES
14.69	99 TH	5.78
14.53	98 TH	5.72
14.43	97 TH	5.68
14.29	95 TH	5.63
14.08	90 TH	5.54
13.94	85 TH	5.49
13.83	80 TH	5.44
13.73	75 TH	5.41
13.65	70 TH	5.37
13.58	65 TH	5.34
13.50	60 TH	5.32
13.44	55 TH	5.29
13.37	50 TH	5.26
13.30	45 TH	5.24
13.24	40 TH	5.21
13.17	35 TH	5.18
13.10	30 TH	5.16
13.02	25 TH	5.13
12.93	20 TH	5.09
12.84	15 TH	5.05
12.71	10 TH	5.01
12.53	5 TH	4.93
12.42	3 RD	4.89
12.33	2 ND	4.85
12.19	1 ST	4.80

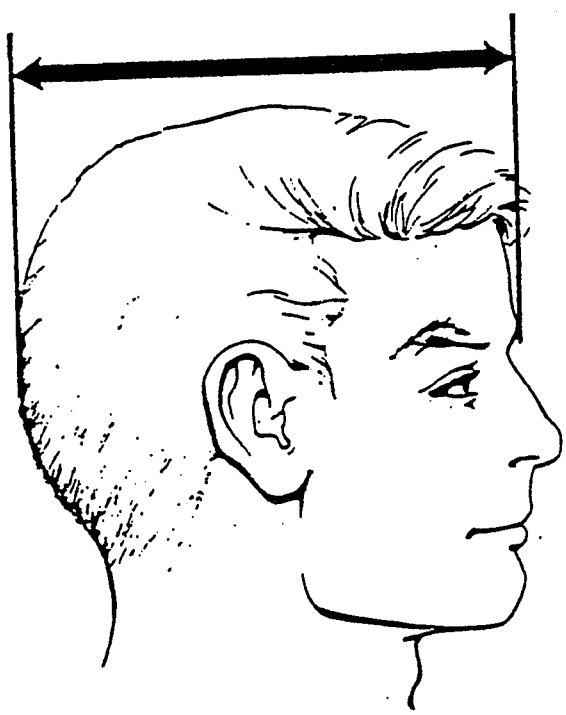
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
13.38	MEAN	5.27
0.01	SE(M)	0.00
0.53	ST DEV	0.21
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.14
KURTOSIS--BETA II = 3.08
COEFFICIENT OF VARIATION = 3.94

SAMPLE SIZE = 4095

Table E-31 HEAD LENGTH



Head Length: Subject sits erect, with head level. The maximum length of the head is measured from the back of the head (occiput) to the forehead (glabella). Spreading calipers are used.

PERCENTILES

CENTIMETERS		INCHES
21.12	99 TH	8.32
20.93	98 TH	8.24
20.80	97 TH	8.19
20.63	95 TH	8.12
20.36	90 TH	8.02
20.18	85 TH	7.94
20.03	80 TH	7.89
19.91	75 TH	7.84
19.80	70 TH	7.80
19.70	65 TH	7.76
19.61	60 TH	7.72
19.51	55 TH	7.68
19.42	50 TH	7.65
19.33	45 TH	7.61
19.24	40 TH	7.58
19.15	35 TH	7.54
19.05	30 TH	7.50
18.94	25 TH	7.46
18.82	20 TH	7.41
18.68	15 TH	7.35
18.50	10 TH	7.28
18.22	5 TH	7.17
18.04	3 RD	7.10
17.89	2 ND	7.05
17.66	1 ST	6.95

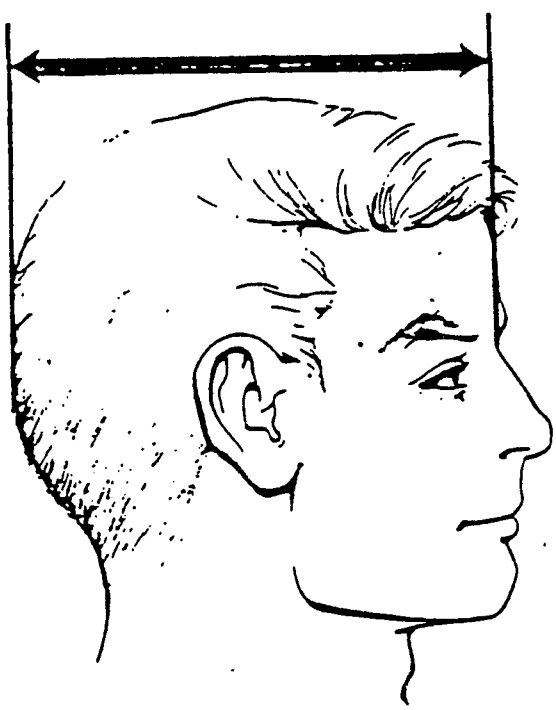
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
19.42	MEAN	7.65
0.01	SE(M)	0.00
0.72	ST DEV	0.28
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.00
KURTOSIS--BETA II = 3.02
COEFFICIENT OF VARIATION = 3.71

SAMPLE SIZE = 4095

Table E-32 OCCIPUT-NASAL ROOT



Occiput-Nasal Root: Subject sits erect, with head level. The distance from the back of the head (occiput) to the nasal root depression between the eyes is measured. Spreading calipers are used.

PERCENTILES

CENTIMETERS		INCHES
20.72	99 TH	8.16
20.51	98 TH	8.07
20.38	97 TH	8.02
20.21	95 TH	7.96
19.95	90 TH	7.85
19.77	85 TH	7.78
19.64	80 TH	7.73
19.52	75 TH	7.68
19.41	70 TH	7.64
19.32	65 TH	7.60
19.22	60 TH	7.57
19.13	55 TH	7.53
19.05	50 TH	7.50
18.96	45 TH	7.46
18.87	40 TH	7.43
18.77	35 TH	7.39
18.67	30 TH	7.35
18.57	25 TH	7.31
18.45	20 TH	7.26
18.30	15 TH	7.21
18.13	10 TH	7.14
17.86	5 TH	7.03
17.69	3 RD	6.96
17.56	2 ND	6.91
17.36	1 ST	6.84

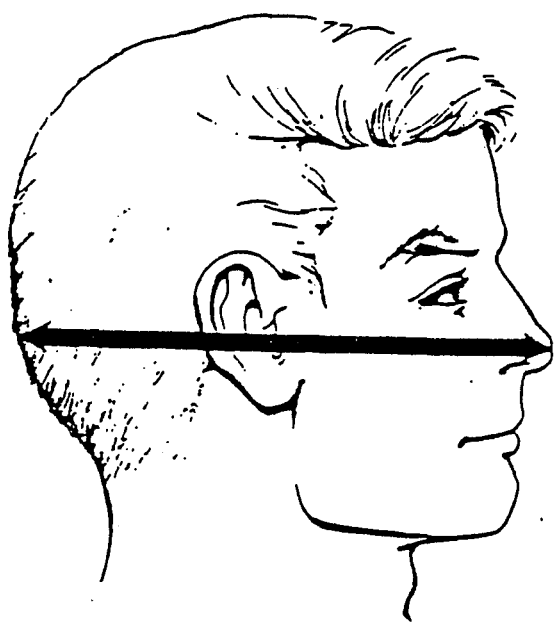
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
19.04	MEAN	7.50
0.01	SE(M)	0.00
0.71	ST DEV	0.28
0.01	SE(SD)	0.00

SYMMETRY--BETA I = -0.03
KURTOSIS--BETA II = 3.08
COEFFICIENT OF VARIATION = 3.73

SAMPLE SIZE = 4095

Table E-33 OCCIPUT-PRONASALE



Occiput-Pronasale: Subject sits erect, with head level. The distance from the back of the head (occiput) to the tip of the nose (pronasale) is measured. Spreading calipers are used.

PERCENTILES

CENTIMETERS		INCHES
23.85	99 TH	9.39
23.67	98 TH	9.32
23.55	97 TH	9.27
23.37	95 TH	9.20
23.09	90 TH	9.09
22.89	85 TH	9.01
22.74	80 TH	8.95
22.60	75 TH	8.90
22.48	70 TH	8.85
22.36	65 TH	8.80
22.26	60 TH	8.76
22.15	55 TH	8.72
22.05	50 TH	8.68
21.95	45 TH	8.64
21.85	40 TH	8.60
21.74	35 TH	8.56
21.63	30 TH	8.52
21.51	25 TH	8.47
21.38	20 TH	8.42
21.22	15 TH	8.36
21.03	10 TH	8.28
20.72	5 TH	8.16
20.52	3 RD	8.08
20.36	2 ND	8.02
20.11	1 ST	7.92

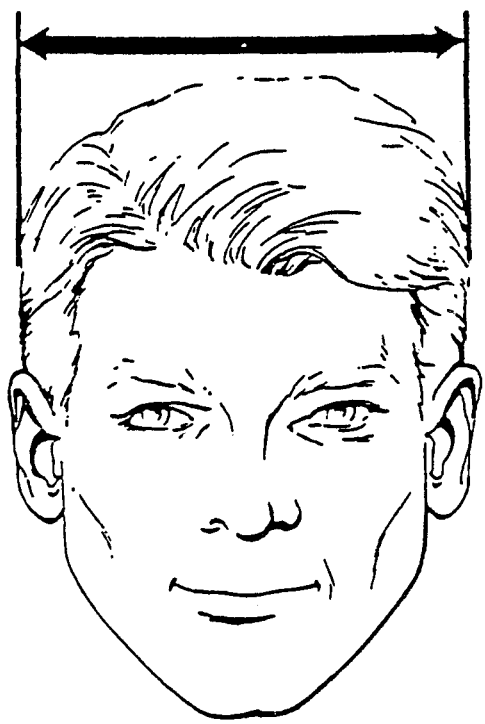
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
22.05	MEAN	8.68
0.01	SE(M)	0.00
0.80	ST DEV	0.31
0.01	SE(SD)	0.00

SYMMETRY--BETA I = -0.08
KURTOSIS--BETA II = 3.18
COEFFICIENT OF VARIATION = 3.61

SAMPLE SIZE = 4095

Table E-34 HEAD BREADTH



Head Breadth: Subject sits erect, with head level. The maximum horizontal breadth of the head is measured above and behind the ears. Spreading calipers are used.

PERCENTILES

CENTIMETERS		INCHES
16.65	99 TH	6.56
16.46	98 TH	6.48
16.35	97 TH	6.44
16.20	95 TH	6.38
15.97	90 TH	6.29
15.83	85 TH	6.23
15.71	80 TH	6.19
15.61	75 TH	6.15
15.53	70 TH	6.11
15.45	65 TH	6.08
15.37	60 TH	6.05
15.30	55 TH	6.02
15.22	50 TH	5.99
15.15	45 TH	5.96
15.08	40 TH	5.94
15.00	35 TH	5.91
14.92	30 TH	5.87
14.84	25 TH	5.84
14.74	20 TH	5.80
14.64	15 TH	5.76
14.50	10 TH	5.71
14.32	5 TH	5.64
14.21	3 RD	5.59
14.13	2 ND	5.56
14.03	1 ST	5.52

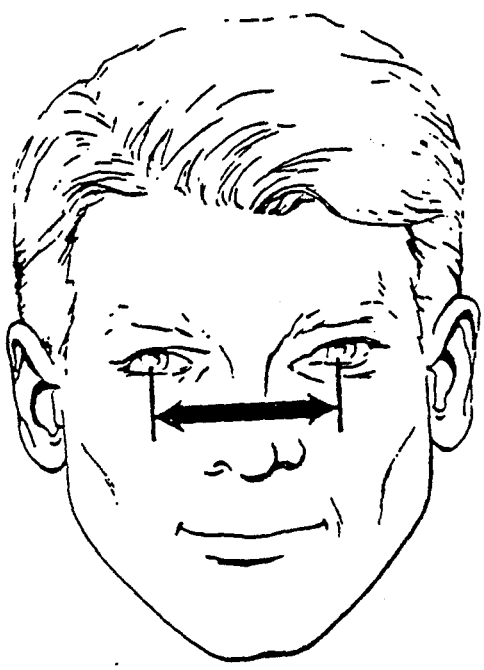
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
15.23	MEAN	6.00
0.01	SE(M)	0.00
0.57	ST DEV	0.23
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.19
KURTOSIS--BETA II = 3.09
COEFFICIENT OF VARIATION = 3.76

SAMPLE SIZE = 4095

Table E-35 INTERPUPILLARY DIS



Interpupillary Breadth: Subject sits erect, with head level. The distance between the centers of the pupils of the eyes is measured. Sliding calipers are used.

PERCENTILES

CENTIMETERS		INCHES
6.92	99 TH	2.73
6.82	98 TH	2.68
6.75	97 TH	2.66
6.66	95 TH	2.62
6.54	90 TH	2.57
6.45	85 TH	2.54
6.38	80 TH	2.51
6.33	75 TH	2.49
6.28	70 TH	2.47
6.23	65 TH	2.45
6.19	60 TH	2.44
6.15	55 TH	2.42
6.11	50 TH	2.40
6.06	45 TH	2.39
6.02	40 TH	2.37
5.98	35 TH	2.35
5.93	30 TH	2.34
5.88	25 TH	2.32
5.83	20 TH	2.29
5.77	15 TH	2.27
5.68	10 TH	2.24
5.56	5 TH	2.19
5.49	3 RD	2.16
5.43	2 ND	2.14
5.34	1 ST	2.10

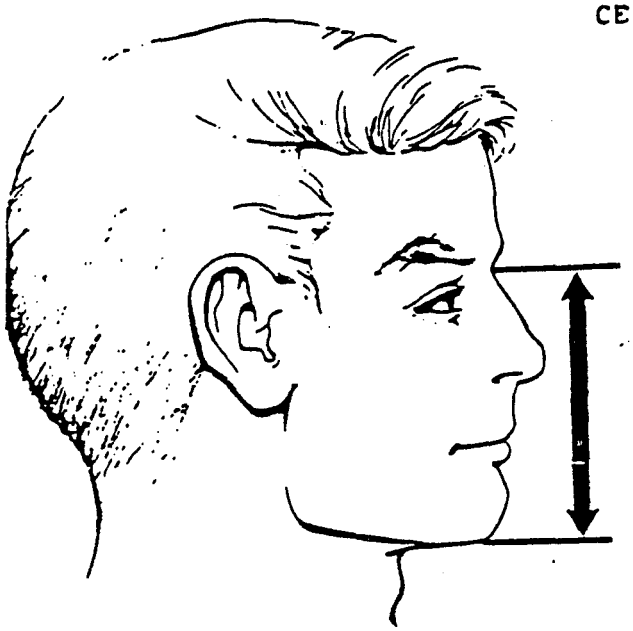
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
6.11	MEAN	2.41
0.01	SE(M)	0.00
0.33	ST DEV	0.13
0.00	SE(SD)	0.00

SYMMETRY--BETA I = 0.09
KURTOSIS--BETA II = 3.38
COEFFICIENT OF VARIATION = 5.34

SAMPLE SIZE = 4095

Table E-36 MENTON-NASAL ROOT



Face Length (Menton-Nasal Root Length): Subject sits erect, with head level. Face Length is measured as the vertical distance from the tip of the chin (menton) to the nasal root depression between the eyes. Sliding calipers are used.

PERCENTILES

CENTIMETERS		INCHES
13.40	99 TH	5.28
13.23	98 TH	5.21
13.12	97 TH	5.17
12.97	95 TH	5.11
12.74	90 TH	5.01
12.58	85 TH	4.95
12.46	80 TH	4.90
12.35	75 TH	4.86
12.26	70 TH	4.83
12.17	65 TH	4.79
12.09	60 TH	4.76
12.02	55 TH	4.73
11.94	50 TH	4.70
11.86	45 TH	4.67
11.79	40 TH	4.64
11.71	35 TH	4.61
11.63	30 TH	4.58
11.54	25 TH	4.54
11.44	20 TH	4.50
11.33	15 TH	4.46
11.19	10 TH	4.40
10.97	5 TH	4.32
10.83	3 RD	4.27
10.73	2 ND	4.22
10.56	1 ST	4.16

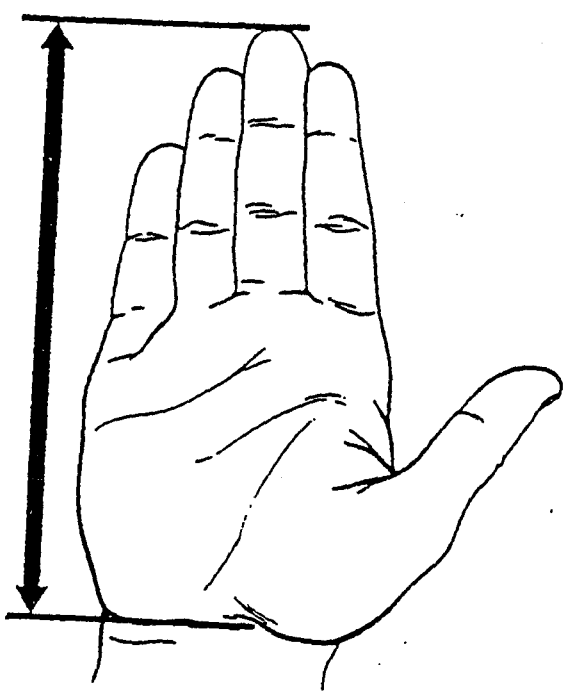
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
11.95	MEAN	4.70
0.01	SE(M)	0.00
0.60	ST DEV	0.24
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.11
KURTOSIS--BETA II = 3.10
COEFFICIENT OF VARIATION = 5.05

SAMPLE SIZE = 4095

Table E-37 HAND LENGTH



Hand Length: Subject sits, with his right hand and fingers extended, palm up. The length of the right hand is measured from the wrist crease to the tip of the middle finger. Sliding calipers are used.

PERCENTILES

CENTIMETERS		INCHES
21.20	99 TH	8.34
20.88	98 TH	8.22
20.68	97 TH	8.14
20.43	95 TH	8.04
20.06	90 TH	7.90
19.82	85 TH	7.81
19.64	80 TH	7.73
19.49	75 TH	7.67
19.35	70 TH	7.62
19.22	65 TH	7.57
19.11	60 TH	7.52
18.99	55 TH	7.48
18.88	50 TH	7.43
18.77	45 TH	7.39
18.66	40 TH	7.35
18.54	35 TH	7.30
18.42	30 TH	7.25
18.29	25 TH	7.20
18.14	20 TH	7.14
17.97	15 TH	7.08
17.76	10 TH	6.99
17.44	5 TH	6.87
17.23	3 RD	6.78
17.08	2 ND	6.73
16.84	1 ST	6.63

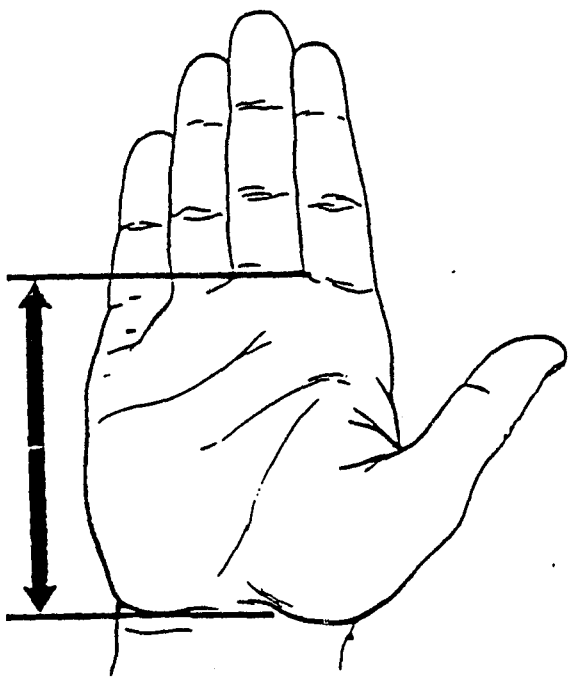
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
18.90	MEAN	7.4
0.01	SE(M)	0.0
0.90	ST DEV	0.3
0.01	SE(SD)	0.0

SYMMETRY--BETA I = 0.1
KURTOSIS--BETA II = 3.1
COEFFICIENT OF VARIATION = 4.7

SAMPLE SIZE = 405

Table E-38 PALM LENGTH



Palm Length: Subject sits, with his right hand and fingers extended, palm up. The length of the palm of the right hand is measured from the wrist crease to the crease at the base of the middle finger. Sliding calipers are used.

PERCENTILES

CENTIMETERS		INCHES
11.75	99 TH	4.63
11.58	98 TH	4.56
11.47	97 TH	4.52
11.33	95 TH	4.46
11.11	90 TH	4.37
10.96	85 TH	4.32
10.85	80 TH	4.27
10.75	75 TH	4.23
10.66	70 TH	4.20
10.58	65 TH	4.17
10.51	60 TH	4.14
10.43	55 TH	4.11
10.36	50 TH	4.08
10.20	45 TH	4.05
10.21	40 TH	4.02
10.13	35 TH	3.99
10.05	30 TH	3.96
9.96	25 TH	3.92
9.86	20 TH	3.88
9.74	15 TH	3.84
9.60	10 TH	3.78
9.38	5 TH	3.69
9.24	3 RD	3.64
9.14	2 ND	3.60
8.98	1 ST	3.54

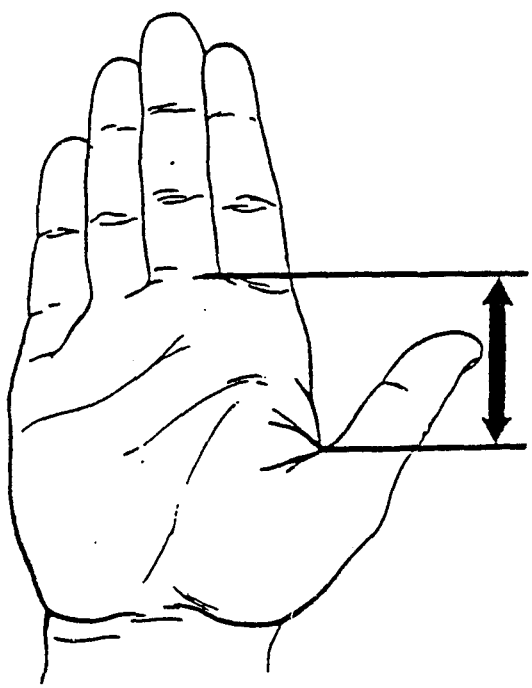
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
10.35	MEAN	4.08
0.01	SE(M)	0.00
0.58	ST DEV	0.23
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.05
KURTOSIS--BETA II = 3.32
COEFFICIENT OF VARIATION = 5.64

SAMPLE SIZE = 4095

Table E-39 THUMB CROTCH-FFB



Thumb Crotch Length: Subject sits, with his right hand and fingers extended, palm up, and with his thumb extended away from the hand. The length of the thumb crotch is measured from the skinfold at the base of the thumb to the notch between the first and second fingers. Sliding calipers are used.

PERCENTILES

CENTIMETERS		INCHES
6.16	99 TH	2.43
6.01	98 TH	2.36
5.91	97 TH	2.33
5.78	95 TH	2.28
5.59	90 TH	2.20
5.46	85 TH	2.15
5.37	80 TH	2.11
5.28	75 TH	2.08
5.21	70 TH	2.05
5.14	65 TH	2.02
5.07	60 TH	2.00
5.01	55 TH	1.97
4.95	50 TH	1.95
4.89	45 TH	1.93
4.83	40 TH	1.90
4.76	35 TH	1.88
4.70	30 TH	1.85
4.62	25 TH	1.82
4.54	20 TH	1.79
4.45	15 TH	1.75
4.32	10 TH	1.70
4.14	5 TH	1.63
4.02	3 RD	1.58
3.93	2 ND	1.55
3.79	1 ST	1.49

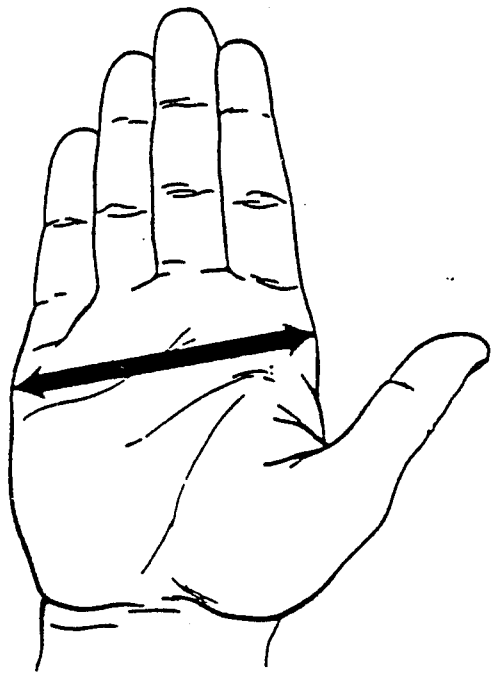
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
4.95	MEAN	1.95
0.01	SE(M)	0.00
0.49	ST DEV	0.19
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.03
KURTOSIS--BETA II = 3.21
COEFFICIENT OF VARIATION = 9.95

SAMPLE SIZE = 4095

Table E-40 HAND BREADTH



Hand Breadth: Subject sits, with his right hand and fingers extended, palm up. The breadth of the hand is measured at the level of the knuckles (distal ends of the metacarpal bones). Sliding calipers are used.

PERCENTILES

CENTIMETERS		INCHES
10.34	99 TH	4.07
10.21	98 TH	4.02
10.12	97 TH	3.98
9.98	95 TH	3.93
9.75	90 TH	3.84
9.59	85 TH	3.78
9.47	80 TH	3.73
9.36	75 TH	3.68
9.26	70 TH	3.65
9.17	65 TH	3.61
9.09	60 TH	3.58
9.01	55 TH	3.55
8.93	50 TH	3.52
8.85	45 TH	3.49
8.78	40 TH	3.46
8.70	35 TH	3.43
8.62	30 TH	3.40
8.54	25 TH	3.36
8.45	20 TH	3.33
8.35	15 TH	3.29
8.23	10 TH	3.24
8.06	5 TH	3.17
7.95	3 RD	3.13
7.86	2 ND	3.10
7.73	1 ST	3.04

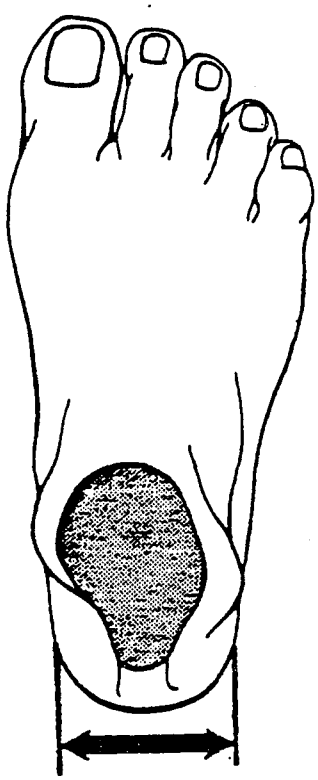
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
8.96	MEAN	3.53
0.01	SE(M)	0.00
0.58	ST DEV	0.23
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.22
KURTOSIS--BETA II = 2.76
COEFFICIENT OF VARIATION = 6.49

SAMPLE SIZE = 4095

Table E-41 HEEL BREADTH



Heel Breadth: Subject stands erect, with his feet slightly apart, and with his weight evenly distributed on both feet. The breadth of the right heel is measured below and behind the projections of the ankles bones (malleoli). Sliding calipers are used.

PERCENTILES

CENTIMETERS		INCHES
7.80	99 TH	3.07
7.66	98 TH	3.02
7.57	97 TH	2.98
7.45	95 TH	2.93
7.27	90 TH	2.86
7.16	85 TH	2.82
7.07	80 TH	2.78
6.99	75 TH	2.75
6.92	70 TH	2.73
6.86	65 TH	2.70
6.81	60 TH	2.68
6.75	55 TH	2.66
6.70	50 TH	2.64
6.65	45 TH	2.62
6.59	40 TH	2.60
6.54	35 TH	2.58
6.49	30 TH	2.55
6.42	25 TH	2.53
6.36	20 TH	2.50
6.28	15 TH	2.47
6.18	10 TH	2.43
6.03	5 TH	2.37
5.92	3 RD	2.33
5.84	2 ND	2.30
5.71	1 ST	2.25

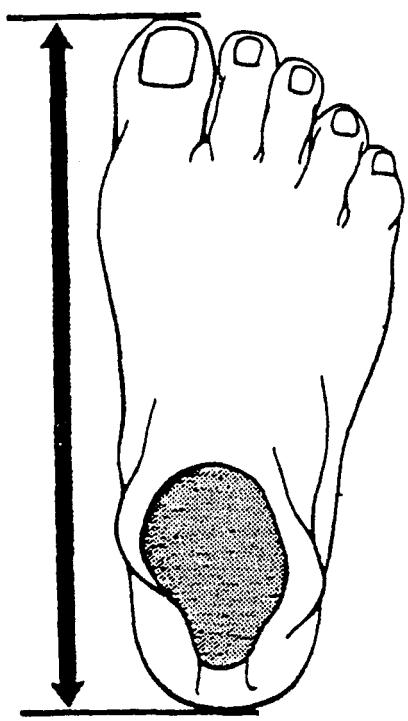
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
6.72	MEAN	2.64
0.01	SE(M)	0.00
0.43	ST DEV	0.17
0.00	SE(SD)	0.00

SYMMETRY--BETA I = 0.23
KURTOSIS--BETA II = 3.36
COEFFICIENT OF VARIATION = 6.42

SAMPLE SIZE = 4095

Table E- 42 FOOT LENGTH



Foot Length: Subject stands erect, with his right foot in a foot measuring box, and with his weight evenly distributed on both feet. The maximum length of the right foot is measured from the back of the heel to the tip of the longest toe. A foot measuring box is used.

PERCENTILES

CENTIMETERS		INCHES
29.71	99 TH	11.70
29.29	98 TH	11.53
29.03	97 TH	11.43
28.69	95 TH	11.30
28.18	90 TH	11.10
27.85	85 TH	10.96
27.59	80 TH	10.86
27.37	75 TH	10.77
27.17	70 TH	10.70
26.99	65 TH	10.62
26.81	60 TH	10.56
26.65	55 TH	10.49
26.48	50 TH	10.43
26.32	45 TH	10.36
26.15	40 TH	10.30
25.98	35 TH	10.23
25.80	30 TH	10.16
25.61	25 TH	10.08
25.40	20 TH	10.00
25.15	15 TH	9.90
24.85	10 TH	9.78
24.42	5 TH	9.61
24.15	3 RD	9.51
23.96	2 ND	9.43
23.68	1 ST	9.32

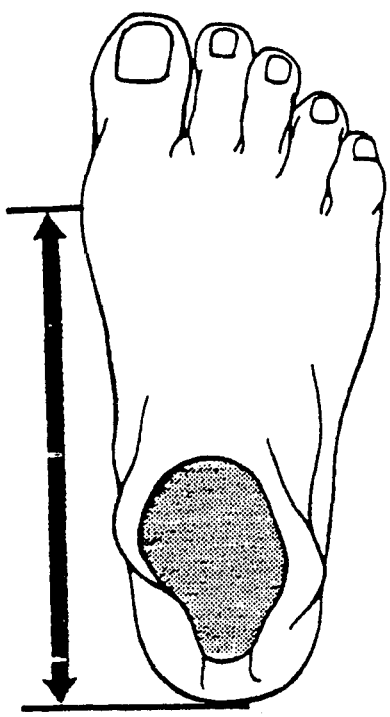
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
26.51	MEAN	10.44
0.02	SE(M)	0.01
1.29	ST DEV	0.51
0.01	SE(SD)	0.01

SYMMETRY--BETA I = 0.13
KURTOSIS--BETA II = 2.94
COEFFICIENT OF VARIATION = 4.87

SAMPLE SIZE = 4095

Table E-43 BALL OF FOOT LTH



Instep Length: Subject stands erect, with his right foot in a foot measuring box, and with his weight evenly distributed on both feet. The length of the instep of the right foot is measured from the back of the heel to the center of the inner ball of the foot (first metatarsal-phalangeal joint). A foot measuring box is used.

PERCENTILES

CENTIMETERS		INCHES
21.96	99 TH	8.65
21.64	98 TH	8.52
21.43	97 TH	8.44
21.16	95 TH	8.33
20.74	90 TH	8.17
20.47	85 TH	8.06
20.25	80 TH	7.97
20.07	75 TH	7.90
19.91	70 TH	7.84
19.76	65 TH	7.78
19.62	60 TH	7.72
19.48	55 TH	7.67
19.35	50 TH	7.62
19.21	45 TH	7.56
19.08	40 TH	7.51
18.94	35 TH	7.46
18.80	30 TH	7.40
18.64	25 TH	7.34
18.47	20 TH	7.27
18.27	15 TH	7.19
18.02	10 TH	7.09
17.65	5 TH	6.95
17.41	3 RD	6.86
17.24	2 ND	6.79
16.96	1 ST	6.68

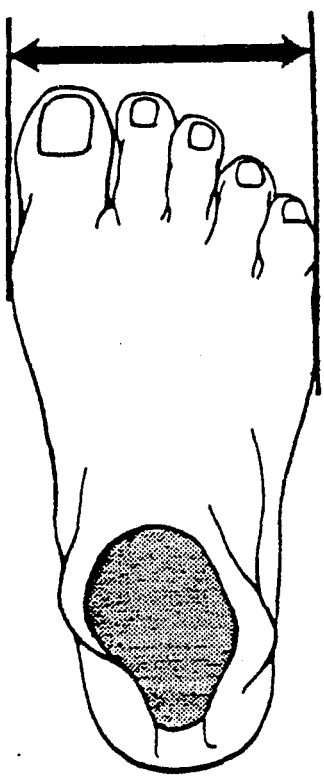
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
19.36	MEAN	7.62
0.02	SE(M)	0.01
1.04	ST DEV	0.41
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.08
KURTOSIS--BETA II = 2.96
COEFFICIENT OF VARIATION = 5.40

SAMPLE SIZE = 4095

Table E-44 BALL OF FOOT BR



Ball Of Foot Breadth: Subject stands erect, with his right foot in a foot measuring box, and with his weight evenly distributed on both feet. The breadth of the right foot is measured between the inner and outer balls of the foot (first and fifth metatarsal-phalangeal joints). A foot measuring box is used.

PERCENTILES

CENTIMETERS		INCHES
11.09	99 TH	4.37
10.92	98 TH	4.30
10.82	97 TH	4.26
10.67	95 TH	4.20
10.45	90 TH	4.11
10.30	85 TH	4.06
10.19	80 TH	4.01
10.10	75 TH	3.97
10.01	70 TH	3.94
9.94	65 TH	3.91
9.86	60 TH	3.88
9.80	55 TH	3.86
9.73	50 TH	3.83
9.66	45 TH	3.80
9.60	40 TH	3.78
9.53	35 TH	3.75
9.46	30 TH	3.72
9.39	25 TH	3.70
9.31	20 TH	3.66
9.21	15 TH	3.63
9.10	10 TH	3.58
8.93	5 TH	3.51
8.82	3 RD	3.47
8.74	2 ND	3.44
8.61	1 ST	3.39

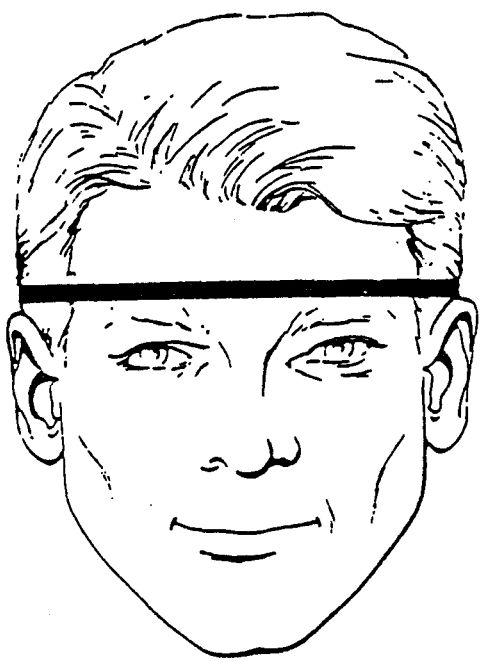
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
9.76	MEAN	3.84
0.01	SE(M)	0.00
0.53	ST DEV	0.21
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.31
KURTOSIS--BETA II = 3.23
COEFFICIENT OF VARIATION = 5.40

SAMPLE SIZE = 4095

Table E-45 HEAD CIRCUMFERENCE



Head Circumference: Subject sits erect, with head level. The maximum circumference of the head is measured. A steel tape is used, with the tape passing just above the bony brow ridges of the forehead and above both ears.

PERCENTILES

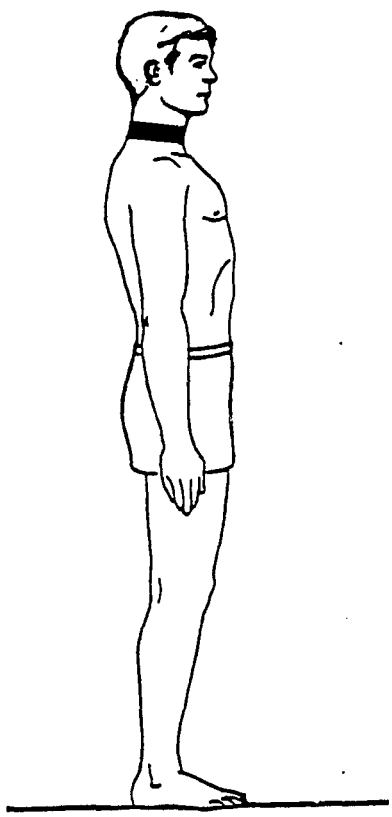
CENTIMETERS		INCHES
59.65	99 TH	23.48
59.21	98 TH	23.31
58.93	97 TH	23.20
58.55	95 TH	23.05
57.95	90 TH	22.82
57.55	85 TH	22.66
57.24	80 TH	22.53
56.97	75 TH	22.43
56.73	70 TH	22.33
56.51	65 TH	22.25
56.30	60 TH	22.17
56.10	55 TH	22.09
55.91	50 TH	22.01
55.71	45 TH	21.93
55.52	40 TH	21.86
55.31	35 TH	21.78
55.10	30 TH	21.69
54.87	25 TH	21.60
54.62	20 TH	21.50
54.32	15 TH	21.39
53.95	10 TH	21.24
53.38	5 TH	21.02
53.01	3 RD	20.87
52.72	2 ND	20.76
52.27	1 ST	20.58

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
55.94	MEAN	22.02
0.02	SE(M)	0.01
1.56	ST DEV	0.62
0.02	SE(SD)	0.01

SYMMETRY--BETA I =	0.08
KURTOSIS--BETA II =	3.07
COEFFICIENT OF VARIATION =	2.79
SAMPLE SIZE =	4095

Table E-46 NECK CIRCUMFERENCE



Neck Circumference: Subject stands erect, with head level. The maximum circumference of the neck is measured. A steel tape is used, with the tape passing just below the "Adam's Apple" (thyroid cartilage).

PERCENTILES

CENTIMETERS		INCHES
41.56	99 TH	16.36
40.92	98 TH	16.11
40.51	97 TH	15.95
39.97	95 TH	15.74
39.15	90 TH	15.41
38.61	85 TH	15.20
38.19	80 TH	15.04
37.84	75 TH	14.90
37.52	70 TH	14.77
37.23	65 TH	14.66
36.96	60 TH	14.55
36.71	55 TH	14.45
36.45	50 TH	14.35
36.20	45 TH	14.25
35.95	40 TH	14.15
35.69	35 TH	14.05
35.42	30 TH	13.95
35.14	25 TH	13.83
34.82	20 TH	13.71
34.46	15 TH	13.57
34.01	10 TH	13.39
33.36	5 TH	13.13
32.95	3 RD	12.97
32.65	2 ND	12.85
32.19	1 ST	12.67

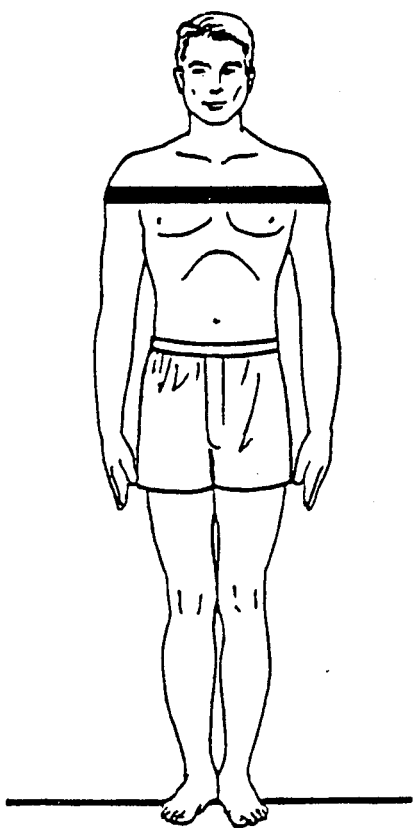
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
36.53	MEAN	14.38
0.03	SE(M)	0.01
2.00	ST DEV	0.79
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.25
KURTOSIS--BETA II = 3.14
COEFFICIENT OF VARIATION = 5.48

SAMPLE SIZE = 4095

Table E-47 SHOULDER CIRCUMFER



Shoulder Circumference: Subject stands erect, with his arms hanging at his sides. The maximum horizontal circumference of the shoulders is measured at the level of the bulges of the deltoid muscles in the upper arms. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
128.81	99 TH	50.71
126.71	98 TH	49.88
125.37	97 TH	49.36
123.56	95 TH	48.64
120.81	90 TH	47.56
119.01	85 TH	46.85
117.62	80 TH	46.31
116.44	75 TH	45.84
115.41	70 TH	45.44
114.47	65 TH	45.07
113.60	60 TH	44.72
112.77	55 TH	44.40
111.97	50 TH	44.08
111.18	45 TH	43.77
110.39	40 TH	43.46
109.60	35 TH	43.15
108.77	30 TH	42.82
107.89	25 TH	42.48
106.92	20 TH	42.10
105.82	15 TH	41.66
104.44	10 TH	41.12
102.40	5 TH	40.32
101.06	3 RD	39.79
100.06	2 ND	39.39
98.42	1 ST	38.75

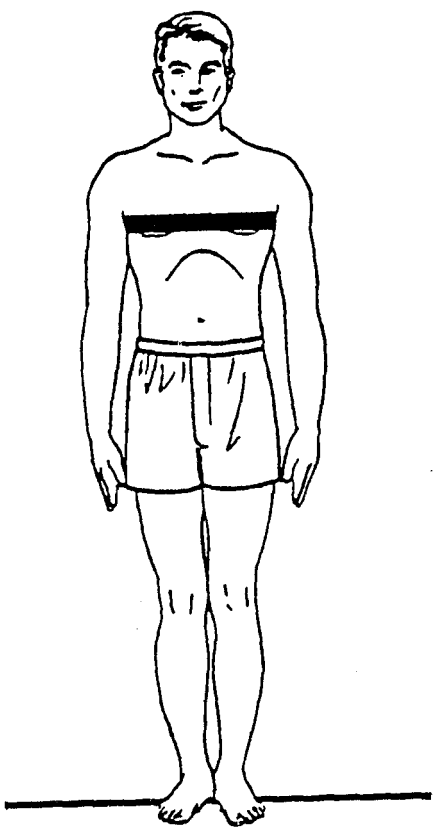
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
112.35	MEAN	44.23
0.10	SE(M)	0.04
6.38	ST DEV	2.51
0.07	SE(SD)	0.03

SYMMETRY--BETA I = 0.27
KURTOSIS--BETA II = 3.03
COEFFICIENT OF VARIATION = 5.68

SAMPLE SIZE = 4095

Table E-48 CHEST CIRCUMFER"CE



Chest Circumference: Subject stands erect, with his arms initially raised and then lowered after the tape is in place. The maximum horizontal circumference of the chest is measured at the level of the nipples during normal breathing. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
111.33	99 TH	43.83
108.81	98 TH	42.84
107.23	97 TH	42.22
105.14	95 TH	41.39
102.03	90 TH	40.17
100.02	85 TH	39.38
98.48	80 TH	38.77
97.20	75 TH	38.27
96.08	70 TH	37.83
95.08	65 TH	37.43
94.15	60 TH	37.07
93.27	55 TH	36.72
92.43	50 TH	36.39
91.60	45 TH	36.06
90.79	40 TH	35.74
89.98	35 TH	35.42
89.14	30 TH	35.09
88.26	25 TH	34.75
87.31	20 TH	34.37
86.24	15 TH	33.95
84.95	10 TH	33.45
83.14	5 TH	32.73
82.01	3 RD	32.29
81.19	2 ND	31.96
79.93	1 ST	31.47

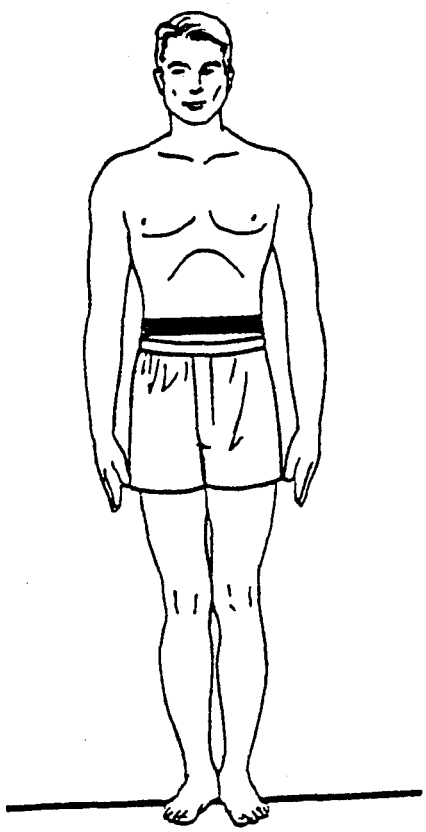
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
93.05	MEAN	36.63
0.10	SE(M)	0.04
6.65	ST DEV	2.62
0.07	SE(SD)	0.03

SYMMETRY--BETA I = 0.52
KURTOSIS--BETA II = 3.24
COEFFICIENT OF VARIATION = 7.14

SAMPLE SIZE = 4095

Table E- 49 WAIST CIRCUMFRNCE



Waist Circumference: Subject stands erect, with abdomen relaxed. The maximum horizontal circumference of the waist is measured at the level of the navel (omphalion). A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
103.23	99 TH	40.64
100.58	98 TH	39.60
98.72	97 TH	38.87
96.06	95 TH	37.82
91.82	90 TH	36.15
89.00	85 TH	35.04
86.84	80 TH	34.19
85.04	75 TH	33.48
83.51	70 TH	32.88
82.15	65 TH	32.34
80.93	60 TH	31.86
79.81	55 TH	31.42
78.77	50 TH	31.01
77.78	45 TH	30.62
76.85	40 TH	30.25
75.94	35 TH	29.90
75.06	30 TH	29.55
74.17	25 TH	29.20
73.25	20 TH	28.84
72.27	15 TH	28.45
71.13	10 TH	28.00
69.48	5 TH	27.36
68.33	3 RD	26.90
67.38	2 ND	26.53
65.61	1 ST	25.83

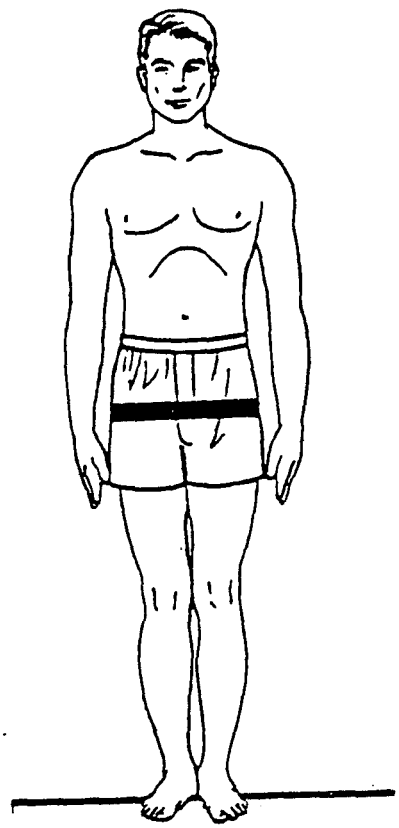
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
80.24	MEAN	31.59
0.13	SE(M)	0.05
8.14	ST DEV	3.21
0.09	SE(SD)	0.04

SYMMETRY--BETA I = 0.80
KURTOSIS--BETA II = 3.47
COEFFICIENT OF VARIATION = 10.15

SAMPLE SIZE = 4095

Table E-50 HIP CIRCUMFERENCE



Hip Circumference: Subject stands erect, with heels together. The maximum horizontal circumference of the hips is measured at the level of the greatest protrusion of the buttock muscles. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
110.65	99 TH	43.56
108.76	98 TH	42.82
107.43	97 TH	42.30
105.54	95 TH	41.55
102.52	90 TH	40.36
100.48	85 TH	39.56
98.91	80 TH	38.94
97.58	75 TH	38.42
96.43	70 TH	37.96
95.41	65 TH	37.56
94.47	60 TH	37.19
93.59	55 TH	36.85
92.76	50 TH	36.52
91.97	45 TH	36.21
91.20	40 TH	35.90
90.44	35 TH	35.61
89.68	30 TH	35.31
88.90	25 TH	35.00
88.07	20 TH	34.67
87.17	15 TH	34.32
86.08	10 TH	33.89
84.53	5 TH	33.28
83.49	3 RD	32.87
82.67	2 ND	32.55
81.26	1 ST	31.99

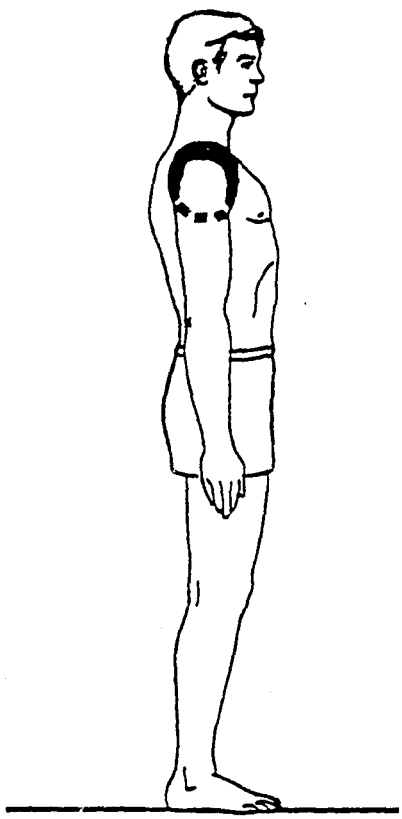
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
93.62	MEAN	36.86
0.10	SE(M)	0.04
6.39	ST DEV	2.51
0.07	SE(SD)	0.03

SYMMETRY--BETA I = 0.58
KURTUSIS--BETA II = 3.21
COEFFICIENT OF VARIATION = 6.82

SAMPLE SIZE = 4095

Table E-51 ARM SCYE CIRCUMFER



Arm Scye Circumference: Subject stands erect, with his right arm initially raised and then lowered after the tape is in place. The vertical circumference of the scye (sleeve armhole area) is measured. A steel tape is used, with the tape passing under the right armpit and over the outer point (acromion) of the right shoulder.

PERCENTILES

CENTIMETERS		INCHES
51.45	99 TH	20.26
50.51	98 TH	19.89
49.88	97 TH	19.64
49.00	95 TH	19.29
47.61	90 TH	18.74
46.68	85 TH	18.38
45.95	80 TH	18.09
45.34	75 TH	17.85
44.80	70 TH	17.64
44.31	65 TH	17.45
43.87	60 TH	17.27
43.44	55 TH	17.10
43.03	50 TH	16.94
42.63	45 TH	16.79
42.24	40 TH	16.63
41.85	35 TH	16.47
41.44	30 TH	16.31
41.01	25 TH	16.15
40.54	20 TH	15.96
40.01	15 TH	15.75
39.34	10 TH	15.49
38.34	5 TH	15.10
37.66	3 RD	14.83
37.14	2 ND	14.62
36.24	1 ST	14.27

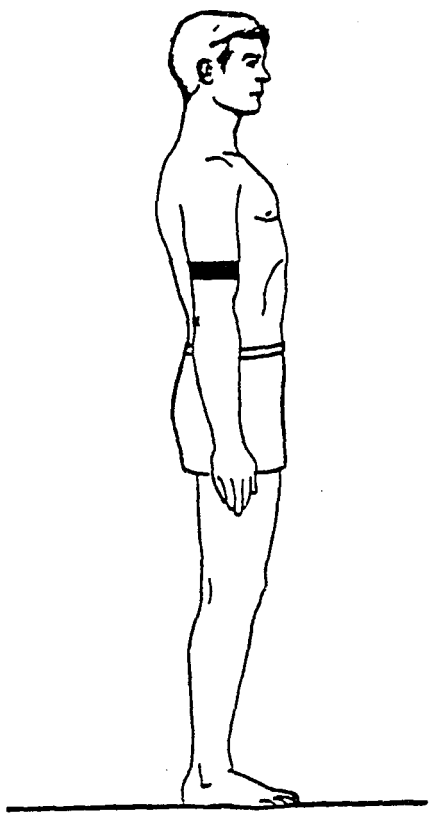
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
43.26	MEAN	17.03
0.05	SE(M)	0.02
3.21	ST DEV	1.26
0.04	SE(SD)	0.01

SYMMETRY--BETA I = 0.31
KURTOSIS--BETA II = 3.37
COEFFICIENT OF VARIATION = 7.42

SAMPLE SIZE = 4095

Table E- 52 BICEPS CIRC/EXTEND



Biceps Circumference, Relaxed: Subject stands erect, with his right arm held slightly away from the body. The circumference of the right upper arm is measured at the level of the biceps muscle, midway between the shoulder and the elbow. A steel tape is used.

PERCENTILES

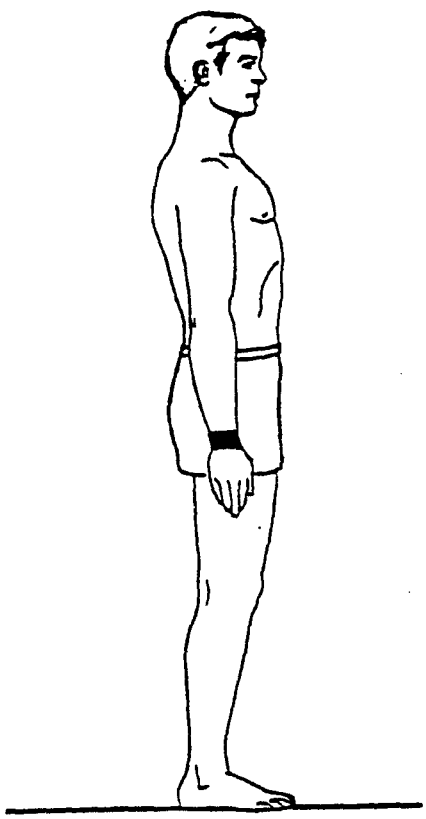
CENTIMETERS		INCHES
36.37	99 TH	14.32
35.47	98 TH	13.96
34.88	97 TH	13.73
34.07	95 TH	13.41
32.81	90 TH	12.92
31.97	85 TH	12.59
31.32	80 TH	12.33
30.77	75 TH	12.12
30.29	70 TH	11.93
29.85	65 TH	11.75
29.45	60 TH	11.59
29.06	55 TH	11.44
28.69	50 TH	11.30
28.33	45 TH	11.15
27.97	40 TH	11.01
27.61	35 TH	10.87
27.24	30 TH	10.73
26.85	25 TH	10.57
26.43	20 TH	10.41
25.96	15 TH	10.22
25.39	10 TH	9.99
24.57	5 TH	9.67
24.05	3 RD	9.47
23.66	2 ND	9.32
23.05	1 ST	9.08

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
28.93	MEAN	11.39
0.05	SE(M)	0.02
2.88	ST DEV	1.13
0.03	SE(SD)	0.01

SYMMETRY--BETA I =	0.38
KURTOSIS--BETA II =	2.99
COEFFICIENT OF VARIATION =	9.95
SAMPLE SIZE =	4095

Table E-53 WRIST CIRCUMFRNCE



Wrist Circumference: Subject stands erect, with his right arm held slightly away from the body. The minimum circumference of the right wrist is measured. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
19.17	99 TH	7.55
18.87	98 TH	7.43
18.69	97 TH	7.36
18.45	95 TH	7.26
18.09	90 TH	7.12
17.86	85 TH	7.03
17.68	80 TH	6.96
17.53	75 TH	6.90
17.39	70 TH	6.85
17.27	65 TH	6.80
17.15	60 TH	6.75
17.04	55 TH	6.71
16.93	50 TH	6.66
16.82	45 TH	6.62
16.71	40 TH	6.58
16.59	35 TH	6.53
16.48	30 TH	6.49
16.35	25 TH	6.44
16.21	20 TH	6.38
16.05	15 TH	6.32
15.85	10 TH	6.24
15.56	5 TH	6.12
15.37	3 RD	6.05
15.24	2 ND	6.00
15.04	1 ST	5.92

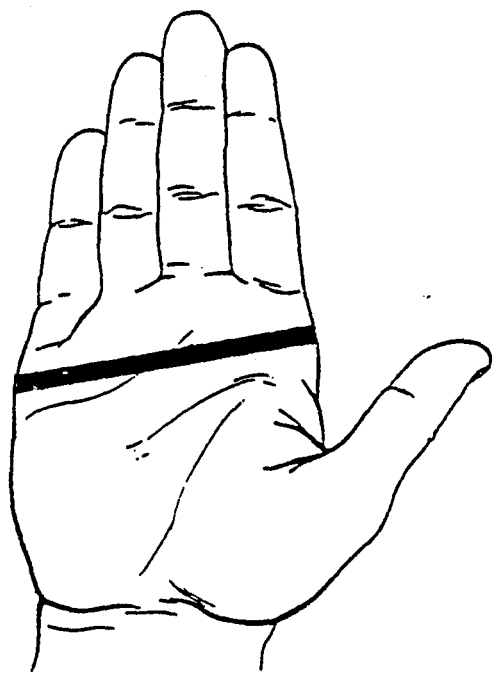
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
16.96	MEAN	6.68
0.01	SE(M)	0.01
0.87	ST DEV	0.34
0.01	SE(SD)	0.00

SYMMETRY--BETA I = 0.18
KURTOSIS--BETA II = 3.07
COEFFICIENT OF VARIATION = 5.12

SAMPLE SIZE = 4095

Table E- 54 HAND CIRCUMFERENCE



Hand Circumference: Subject sits, with his right hand and fingers extended, palm up. The maximum circumference of the hand is measured at the level of the knuckles (distal ends of the metacarpal bones). A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
24.15	99 TH	9.51
23.78	98 TH	9.36
23.55	97 TH	9.27
23.25	95 TH	9.16
22.82	90 TH	8.99
22.54	85 TH	8.87
22.32	80 TH	8.79
22.14	75 TH	8.72
21.97	70 TH	8.65
21.82	65 TH	8.59
21.68	60 TH	8.53
21.54	55 TH	8.48
21.40	50 TH	8.43
21.26	45 TH	8.37
21.13	40 TH	8.32
20.98	35 TH	8.26
20.83	30 TH	8.20
20.67	25 TH	8.14
20.49	20 TH	8.07
20.29	15 TH	7.99
20.03	10 TH	7.89
19.67	5 TH	7.74
19.45	3 RD	7.66
19.29	2 ND	7.60
19.07	1 ST	7.51

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
21.42	MEAN	8.43
0.02	SE(M)	0.01
1.08	ST DEV	0.43
0.01	SE(SD)	0.00
	SYMMETRY--BETA I =	0.17
	KURTOSIS--BETA II =	3.08
	COEFFICIENT OF VARIATION =	5.04
	SAMPLE SIZE =	4095

Table E-55 BICEPS CIRC/FLEXED

Biceps Circumference, Flexed: Subject stands erect, with his right arm bent, fist clenched, and biceps muscle flexed. The maximum circumference of the right upper arm is measured at the greatest bulge of the flexed biceps muscle. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
38.47	99 TH	15.15
37.74	98 TH	14.86
37.25	97 TH	14.66
36.55	95 TH	14.39
35.44	90 TH	13.95
34.68	85 TH	13.65
34.08	80 TH	13.42
33.57	75 TH	13.22
33.12	70 TH	13.04
32.71	65 TH	12.88
32.33	60 TH	12.73
31.96	55 TH	12.58
31.61	50 TH	12.45
31.26	45 TH	12.31
30.92	40 TH	12.17
30.57	35 TH	12.04
30.21	30 TH	11.89
29.83	25 TH	11.74
29.41	20 TH	11.58
28.95	15 TH	11.40
28.37	10 TH	11.17
27.54	5 TH	10.84
26.99	3 RD	10.63
26.59	2 ND	10.47
25.94	1 ST	10.21

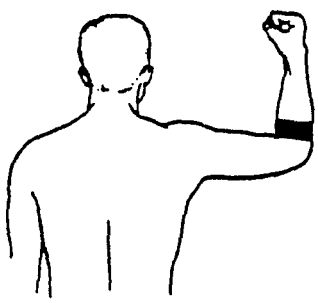
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
31.79	MEAN	12.52
0.04	SE(M)	0.02
2.72	ST DEV	1.07
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.24
KURTOSIS--BETA II = 2.91
COEFFICIENT OF VARIATION = 8.55

SAMPLE SIZE = 4095

Table E-56 FOREARM CIR/FLEXED



Forearm Circumference, Flexed: Subject stands erect, with his right arm bent, fist clenched, and arm muscles flexed. The maximum circumference of the right forearm is measured at the greatest bulge of the flexed forearm muscles. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
33.45	99 TH	13.17
32.84	98 TH	12.93
32.45	97 TH	12.78
31.94	95 TH	12.57
31.15	90 TH	12.26
30.62	85 TH	12.06
30.21	80 TH	11.90
29.86	75 TH	11.76
29.55	70 TH	11.64
29.27	65 TH	11.52
29.00	60 TH	11.42
28.75	55 TH	11.32
28.49	50 TH	11.22
28.25	45 TH	11.12
28.00	40 TH	11.02
27.74	35 TH	10.92
27.47	30 TH	10.82
27.19	25 TH	10.70
26.87	20 TH	10.58
26.51	15 TH	10.44
26.06	10 TH	10.26
25.41	5 TH	10.00
25.00	3 RD	9.84
24.70	2 ND	9.72
24.24	1 ST	9.54

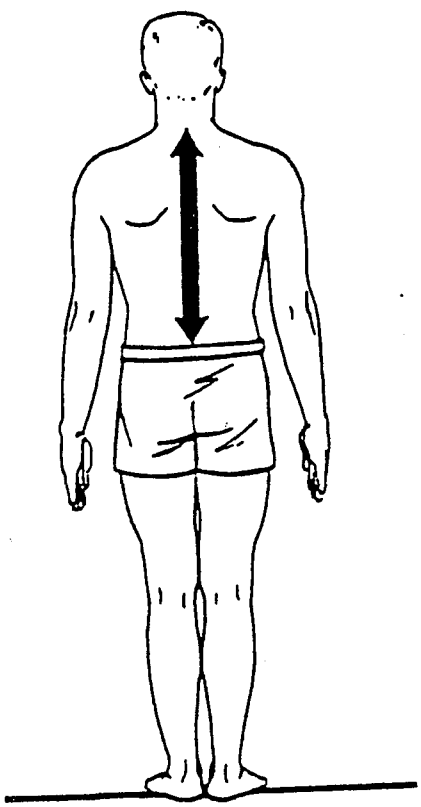
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
28.56	MEAN	11.24
0.03	SE(M)	0.01
1.97	ST DEV	0.78
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.17
KURTOSIS--BETA II = 3.04
COEFFICIENT OF VARIATION = 6.90

SAMPLE SIZE = 4095

Table E- 57 WAIST BACK LENGTH



Waist Back Length: Subject stands erect, with head level. Waist back length is measured as the vertical distance along the surface of the back from the cervical point (the bony protrusion of the 7th cervical vertebra at the base of the neck) to the level of the waist. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
52.44	99 TH	20.65
51.51	98 TH	20.28
50.89	97 TH	20.04
50.02	95 TH	19.69
48.64	90 TH	19.15
47.68	85 TH	18.77
46.92	80 TH	18.47
46.26	75 TH	18.21
45.67	70 TH	17.98
45.12	65 TH	17.76
44.61	60 TH	17.56
44.11	55 TH	17.37
43.63	50 TH	17.18
43.15	45 TH	16.99
42.67	40 TH	16.80
42.18	35 TH	16.60
41.67	30 TH	16.40
41.12	25 TH	16.19
40.53	20 TH	15.96
39.87	15 TH	15.70
39.06	10 TH	15.38
37.93	5 TH	14.93
37.25	3 RD	14.67
36.78	2 ND	14.48
36.09	1 ST	14.21

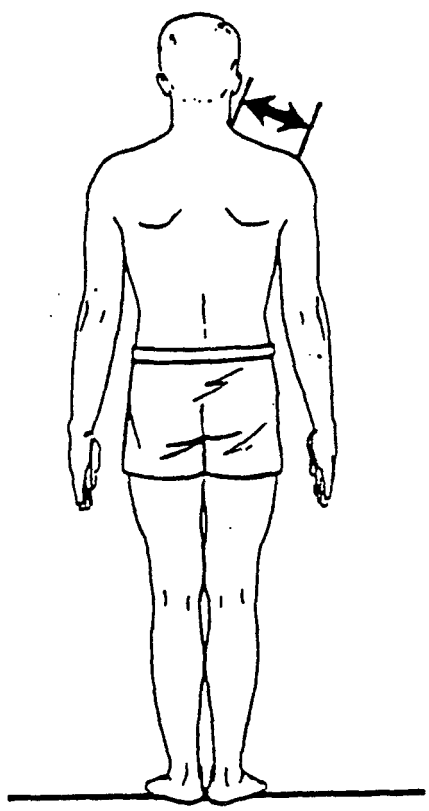
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
43.81	MEAN	17.25
0.06	SE(M)	0.02
3.65	ST DEV	1.44
0.04	SE(SD)	0.02

SYMMETRY--BETA I = 0.14
KURTOSIS--BETA II = 2.70
COEFFICIENT OF VARIATION = 8.34

SAMPLE SIZE = 4095

Table E-58 SHOULDER LENGTH



Shoulder Length: Subject stands erect, with head level. Shoulder length is measured as the distance along the upper surface of the right shoulder, from the base of the neck to the outer point (acromion) of the shoulder. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
20.33	99 TH	8.00
20.03	98 TH	7.88
19.85	97 TH	7.81
19.57	95 TH	7.71
19.04	90 TH	7.50
18.54	85 TH	7.30
18.02	80 TH	7.09
17.59	75 TH	6.93
17.32	70 TH	6.82
17.12	65 TH	6.74
16.92	60 TH	6.66
16.66	55 TH	6.56
16.42	50 TH	6.47
16.27	45 TH	6.40
16.11	40 TH	6.34
15.95	35 TH	6.28
15.72	30 TH	6.19
15.48	25 TH	6.10
15.24	20 TH	6.00
15.00	15 TH	5.90
14.59	10 TH	5.74
14.11	5 TH	5.56
13.85	3 RD	5.45
13.51	2 ND	5.32
13.07	1 ST	5.15

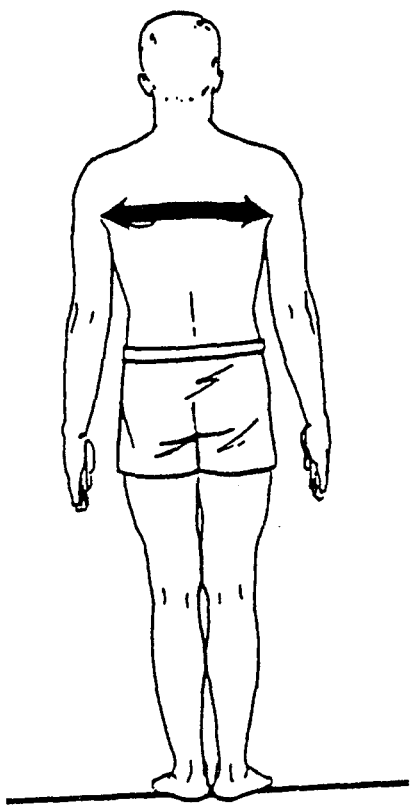
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
16.63	MEAN	6.55
0.03	SE(M)	0.01
1.62	ST DEV	0.64
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.20
KURTOSIS--BETA II = 2.92
COEFFICIENT OF VARIATION = 9.77

SAMPLE SIZE = 4095

Table E-59 INTERSCYE DISTANCE



Interscye Breadth: Subject stands erect, with his arms at his sides. Interscye breadth is measured as the horizontal distance across the surface of the back between the upper ends of the armpit creases (scye points). A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
47.56	99 TH	18.72
46.34	98 TH	18.24
45.61	97 TH	17.96
44.67	95 TH	17.59
43.33	90 TH	17.06
42.48	85 TH	16.72
41.83	80 TH	16.47
41.28	75 TH	16.25
40.79	70 TH	16.06
40.35	65 TH	15.89
39.93	60 TH	15.72
39.53	55 TH	15.56
39.13	50 TH	15.41
38.74	45 TH	15.25
38.33	40 TH	15.09
37.92	35 TH	14.93
37.48	30 TH	14.76
37.00	25 TH	14.57
36.47	20 TH	14.36
35.84	15 TH	14.11
35.05	10 TH	13.80
33.86	5 TH	13.33
33.08	3 RD	13.02
32.51	2 ND	12.80
31.61	1 ST	12.44

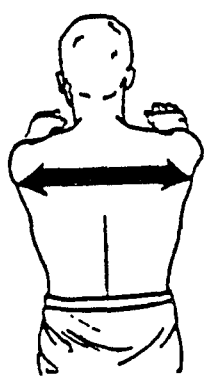
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
39.26	MEAN	15.46
0.05	SE(M)	0.02
3.26	ST DEV	1.28
0.04	SE(SD)	0.01

SYMMETRY--BETA I = 0.15
KURTOSIS--BETA II = 3.22
COEFFICIENT OF VARIATION = 8.29

SAMPLE SIZE = 4095

Table E- 60 INTERSCYE MAXIMUM



Interscye, Maximum: Subject stands erect, with his arms extended forward horizontally. Interscye, maximum is measured as the horizontal distance across the surface of the back between the rear borders of the right and left armpits (scye points). A steel tape is used.

PERCENTILES

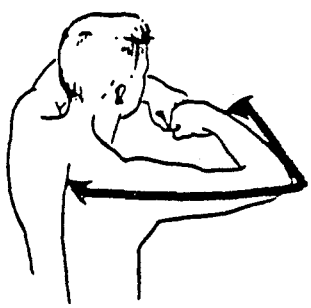
CENTIMETERS		INCHES
62.67	99 TH	24.67
61.64	98 TH	24.27
60.96	97 TH	24.00
60.00	95 TH	23.62
58.49	90 TH	23.03
57.47	85 TH	22.63
56.67	80 TH	22.31
55.97	75 TH	22.04
55.36	70 TH	21.80
54.80	65 TH	21.58
54.28	60 TH	21.37
53.78	55 TH	21.17
53.29	50 TH	20.98
52.80	45 TH	20.79
52.32	40 TH	20.60
51.82	35 TH	20.40
51.31	30 TH	20.20
50.76	25 TH	19.98
50.15	20 TH	19.75
49.46	15 TH	19.47
48.59	10 TH	19.13
47.29	5 TH	18.62
46.44	3 RD	18.28
45.79	2 ND	18.03
44.74	1 ST	17.61

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
53.46	MEAN	21.05
0.06	SE(M)	0.02
3.79	ST DEV	1.49
0.04	SE(SD)	0.02

SYMMETRY--BETA I =	0.14
KURTOSIS--BETA II =	3.06
COEFFICIENT OF VARIATION =	7.09
SAMPLE SIZE =	4095

Table E- 61 SLEEVE LENGTH



Sleeve Length: Subject stands erect, with his arms bent at the elbows, fists pressed together in front of him, and with his arms held horizontally. Sleeve length is measured as the horizontal distance along the outer surface of the right arm, from the middle of the back, over the elbow, to the center of the bony prominence at the outer edge of the wrist (styloid process of the ulna). A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
95.68	99 TH	37.67
94.51	98 TH	37.21
93.77	97 TH	36.92
92.77	95 TH	36.52
91.24	90 TH	35.92
90.22	85 TH	35.52
89.42	80 TH	35.21
88.74	75 TH	34.94
88.14	70 TH	34.70
87.58	65 TH	34.48
87.06	60 TH	34.28
86.56	55 TH	34.08
86.06	50 TH	33.88
85.56	45 TH	33.69
85.06	40 TH	33.49
84.55	35 TH	33.29
84.00	30 TH	33.07
83.41	25 TH	32.84
82.74	20 TH	32.57
81.96	15 TH	32.27
80.95	10 TH	31.87
79.40	5 TH	31.26
78.34	3 RD	30.84
77.54	2 ND	30.53
76.21	1 ST	30.00

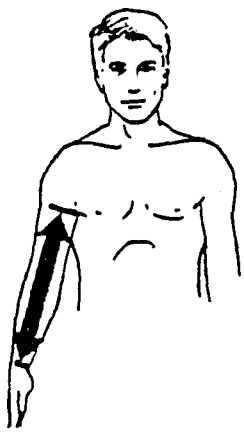
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
86.11	MEAN	33.90
0.06	SE(M)	0.02
4.03	ST DEV	1.59
0.04	SE(SD)	0.02

SYMMETRY--BETA I = -0.05
KURTOSIS--BETA II = 3.18
COEFFICIENT OF VARIATION = 4.68

SAMPLE SIZE = 4095

Table E-62 SLEEVE INSEAM



Sleeve Inseam Length: Subject stands erect, with his right arm extended and held slightly away from the body. Sleeve inseam length is measured as the distance along the inner surface of the right arm, from the front edge of the armpit to the wrist. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
54.78	99 TH	21.57
53.99	98 TH	21.26
53.50	97 TH	21.06
52.84	95 TH	20.80
51.84	90 TH	20.41
51.19	85 TH	20.15
50.68	80 TH	19.95
50.24	75 TH	19.78
49.85	70 TH	19.63
49.49	65 TH	19.49
49.16	60 TH	19.35
48.83	55 TH	19.23
48.51	50 TH	19.10
48.19	45 TH	18.97
47.87	40 TH	18.85
47.54	35 TH	18.72
47.19	30 TH	18.58
46.81	25 TH	18.43
46.38	20 TH	18.26
45.89	15 TH	18.07
45.26	10 TH	17.82
44.31	5 TH	17.44
43.68	3 RD	17.20
43.21	2 ND	17.01
42.45	1 ST	16.71

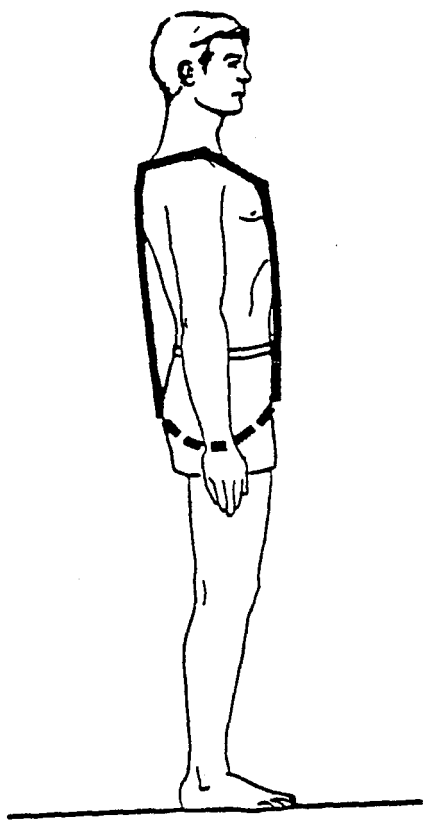
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
48.53	MEAN	19.11
0.04	SE(M)	0.02
2.57	ST DEV	1.01
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.04
KURTOSIS--BETA II = 3.06
COEFFICIENT OF VARIATION = 5.29

SAMPLE SIZE = 4095

Table E- 63 VERTICAL TRUNK CIR



Vertical Trunk Circumference, Standing: Subject stands erect, with his feet slightly apart. The vertical circumference of the trunk is measured. A steel tape is used, with the tape passing through the crotch and over the midpoints of the right buttock and right shoulder.

PERCENTILES

CENTIMETERS		INCHES
185.29	99 TH	72.95
182.48	98 TH	71.84
180.70	97 TH	71.14
178.31	95 TH	70.20
174.68	90 TH	68.77
172.27	85 TH	67.82
170.40	80 TH	67.09
168.80	75 TH	66.46
167.38	70 TH	65.90
166.09	65 TH	65.39
164.87	60 TH	64.91
163.70	55 TH	64.45
162.56	50 TH	64.00
161.42	45 TH	63.55
160.29	40 TH	63.11
159.12	35 TH	62.65
157.91	30 TH	62.17
156.60	25 TH	61.65
155.15	20 TH	61.08
153.49	15 TH	60.43
151.41	10 TH	59.61
148.37	5 TH	58.41
146.40	3 RD	57.64
144.96	2 ND	57.07
142.69	1 ST	56.18

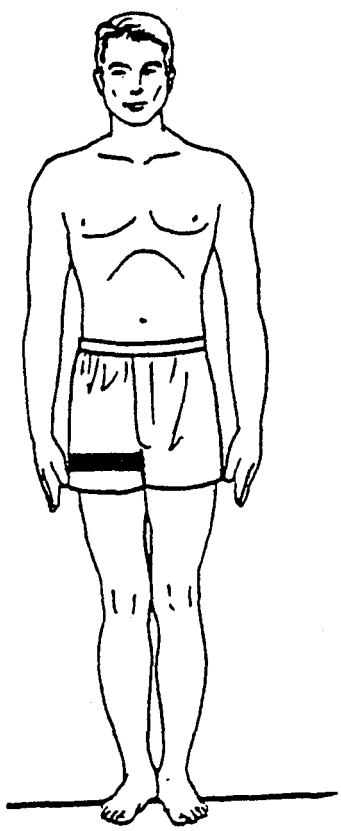
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
162.88	MEAN	64.13
0.14	SE(M)	0.06
9.03	ST DEV	3.56
0.10	SE(SD)	0.04

SYMMETRY--BETA I = 0.18
KURTOSIS--BETA II = 3.02
COEFFICIENT OF VARIATION = 5.54

SAMPLE SIZE = 4095

Table E-64 UPPER THIGH CIRCUM



Upper Thigh Circumference: Subject stands erect, with his feet slightly apart. The horizontal circumference of the right upper thigh is measured. A steel tape is used, with the tape passing just below the gluteal furrow.

PERCENTILES

CENTIMETERS		INCHES
67.91	99 TH	26.73
66.55	98 TH	26.20
65.60	97 TH	25.83
64.21	95 TH	25.28
61.98	90 TH	24.40
60.44	85 TH	23.80
59.24	80 TH	23.32
58.22	75 TH	22.92
57.33	70 TH	22.57
56.53	65 TH	22.26
55.79	60 TH	21.97
55.10	55 TH	21.69
54.43	50 TH	21.43
53.79	45 TH	21.18
53.16	40 TH	20.93
52.54	35 TH	20.69
51.91	30 TH	20.44
51.26	25 TH	20.18
50.57	20 TH	19.91
49.81	15 TH	19.61
48.91	10 TH	19.26
47.63	5 TH	18.75
46.81	3 RD	18.43
46.19	2 ND	18.19
45.16	1 ST	17.78

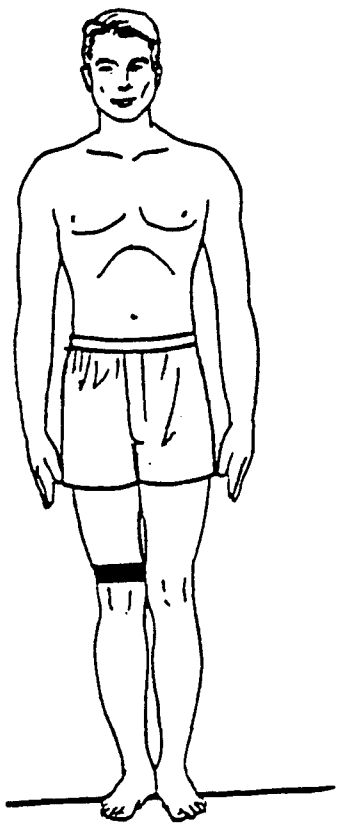
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
54.99	MEAN	21.65
0.08	SE(M)	0.03
5.00	ST DEV	1.97
0.06	SE(SD)	0.02

SYMMETRY--BETA I = 0.46
KURTOSIS--BETA II = 2.91
COEFFICIENT OF VARIATION = 9.08

SAMPLE SIZE = 4095

Table E-65 LOWER THIGH CIRCUM



Lower Thigh Circumference: Subject stands erect, with his feet slightly apart. The horizontal circumference of the right lower thigh is measured. A steel tape is used, with the tape passing above the upper edge of the kneecap (patella).

PERCENTILES

CENTIMETERS		INCHES
52.61	99 TH	20.71
51.19	98 TH	20.15
50.29	97 TH	19.80
49.06	95 TH	19.32
47.20	90 TH	18.58
45.97	85 TH	18.10
45.01	80 TH	17.72
44.20	75 TH	17.40
43.49	70 TH	17.12
42.85	65 TH	16.87
42.25	60 TH	16.63
41.68	55 TH	16.41
41.13	50 TH	16.19
40.59	45 TH	15.98
40.06	40 TH	15.77
39.52	35 TH	15.56
38.97	30 TH	15.34
38.39	25 TH	15.12
37.77	20 TH	14.87
37.08	15 TH	14.60
36.25	10 TH	14.27
35.12	5 TH	13.83
34.44	3 RD	13.56
33.98	2 ND	13.38
33.29	1 ST	13.11

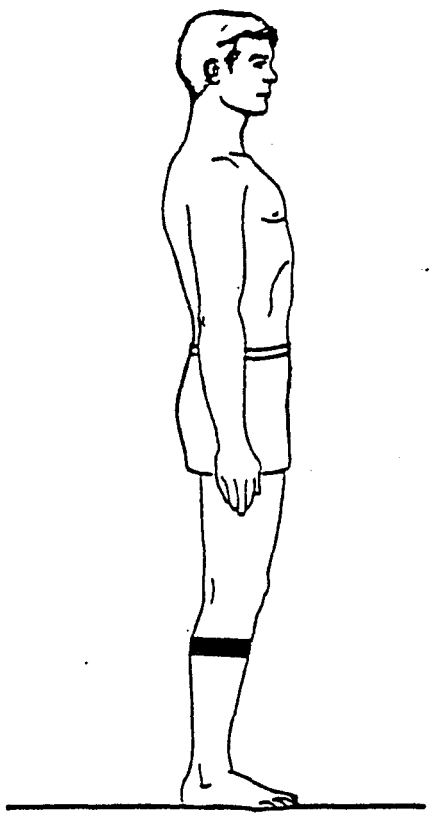
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
41.49	MEAN	16.34
0.07	SE(M)	0.03
4.23	ST DEV	1.66
0.05	SE(SD)	0.02

SYMMETRY--BETA I = 0.43
KURTOSIS--BETA II = 3.03
COEFFICIENT OF VARIATION = 10.19

SAMPLE SIZE = 4095

Table E-66 CALF CIRCUMFERENCE



Calf Circumference: Subject stands erect, with his feet slightly apart. The horizontal circumference of the right lower leg is measured at the level of the greatest bulge of the calf muscle. A steel tape is used.

PERCENTILES

CENTIMETERS		INCHES
43.17	99 TH	17.00
42.46	98 TH	16.72
41.98	97 TH	16.53
41.30	95 TH	16.26
40.20	90 TH	15.83
39.45	85 TH	15.53
38.86	80 TH	15.30
38.34	75 TH	15.10
37.89	70 TH	14.92
37.48	65 TH	14.76
37.10	60 TH	14.60
36.73	55 TH	14.46
36.37	50 TH	14.32
36.02	45 TH	14.18
35.67	40 TH	14.05
35.32	35 TH	13.91
34.96	30 TH	13.76
34.57	25 TH	13.61
34.15	20 TH	13.45
33.68	15 TH	13.26
33.09	10 TH	13.03
32.23	5 TH	12.69
31.68	3 RD	12.47
31.27	2 ND	12.31
30.60	1 ST	12.05

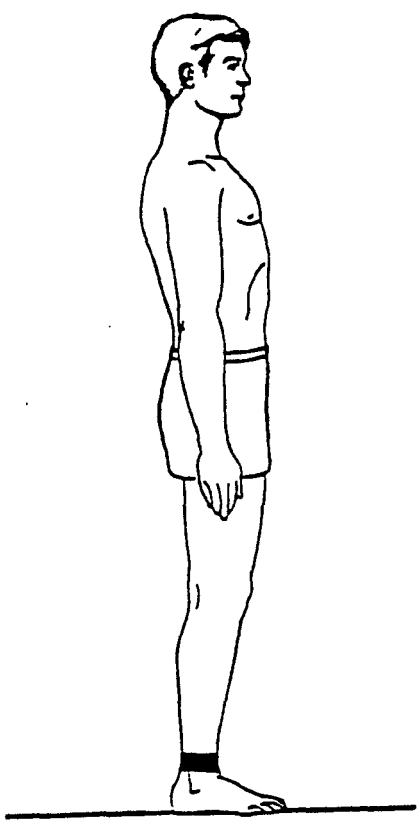
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
36.51	MEAN	14.37
0.04	SE(M)	0.02
2.73	ST DEV	1.07
0.03	SE(SD)	0.01

SYMMETRY--BETA I = 0.25
KURTOSIS--BETA II = 2.91
COEFFICIENT OF VARIATION = 7.47

SAMPLE SIZE = 4095

Table E- 67 ANKLE CIRCUMFRNCE



Ankle Circumference: Subject stands erect, with his feet slightly apart. The minimum horizontal circumference of the right ankle is measured. A steel tape is used, with the tape passing above the projections of the ankle bones (malleoli).

PERCENTILES

CENTIMETERS		INCHES
27.41	99 TH	10.79
26.83	98 TH	10.56
26.48	97 TH	10.42
26.01	95 TH	10.24
25.31	90 TH	9.97
24.86	85 TH	9.79
24.52	80 TH	9.65
24.23	75 TH	9.54
23.98	70 TH	9.44
23.75	65 TH	9.35
23.53	60 TH	9.27
23.33	55 TH	9.19
23.14	50 TH	9.11
22.94	45 TH	9.03
22.75	40 TH	8.96
22.56	35 TH	8.88
22.35	30 TH	8.80
22.14	25 TH	8.72
21.90	20 TH	8.62
21.63	15 TH	8.52
21.29	10 TH	8.38
20.79	5 TH	8.19
20.47	3 RD	8.06
20.23	2 ND	7.96
19.84	1 ST	7.81

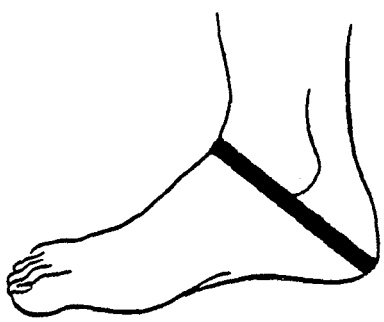
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
23.24	MEAN	9.15
0.02	SE(M)	0.01
1.58	ST DEV	0.62
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.36
KURTOSIS--BETA II = 3.27
COEFFICIENT OF VARIATION = 6.78

SAMPLE SIZE = 4095

Table E-68 HEEL-ANKLE CIRCUMF



Heel-Ankle Circumference: Subject stands erect, with his feet slightly apart, and with his weight evenly distributed on both feet. The diagonal circumference of the right ankle is measured. A steel tape is used, with the tape passing under the tip of the heel and over the junction of the leg and the foot.

PERCENTILES

CENTIMETERS		INCHES
38.45	99 TH	15.14
37.88	98 TH	14.92
37.54	97 TH	14.78
37.09	95 TH	14.60
36.42	90 TH	14.34
35.98	85 TH	14.17
35.64	80 TH	14.03
35.35	75 TH	13.92
35.08	70 TH	13.81
34.84	65 TH	13.72
34.62	60 TH	13.63
34.40	55 TH	13.54
34.18	50 TH	13.46
33.96	45 TH	13.37
33.74	40 TH	13.28
33.52	35 TH	13.20
33.28	30 TH	13.10
33.02	25 TH	13.00
32.73	20 TH	12.89
32.40	15 TH	12.76
31.99	10 TH	12.59
31.39	5 TH	12.36
31.01	3 RD	12.21
30.75	2 ND	12.10
30.35	1 ST	11.95

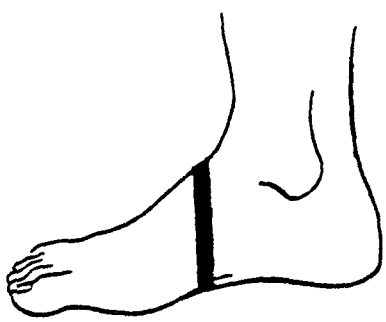
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
34.21	MEAN	13.47
0.03	SE(M)	0.01
1.71	ST DEV	0.67
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.14
KURTOSIS--BETA II = 3.04
COEFFICIENT OF VARIATION = 5.01

SAMPLE SIZE = 4095

Table E- 69 INSTEP CIRCUMF"NCE



Instep Circumference: Subject stands erect, with his feet slightly apart, and with his weight evenly distributed on both feet. The vertical circumference of the instep of the right foot is measured. A steel tape is used, with the tape passing under the foot and over the junction of the leg and foot.

PERCENTILES

CENTIMETERS		INCHES
29.24	99 TH	11.51
28.73	98 TH	11.31
28.42	97 TH	11.19
28.01	95 TH	11.03
27.40	90 TH	10.79
27.01	85 TH	10.63
26.72	80 TH	10.52
26.47	75 TH	10.42
26.25	70 TH	10.33
26.06	65 TH	10.26
25.87	60 TH	10.19
25.70	55 TH	10.12
25.53	50 TH	10.05
25.37	45 TH	9.99
25.20	40 TH	9.92
25.03	35 TH	9.86
24.86	30 TH	9.79
24.67	25 TH	9.71
24.46	20 TH	9.63
24.21	15 TH	9.53
23.90	10 TH	9.41
23.42	5 TH	9.22
23.09	3 RD	9.09
22.84	2 ND	8.99
22.43	1 ST	8.83

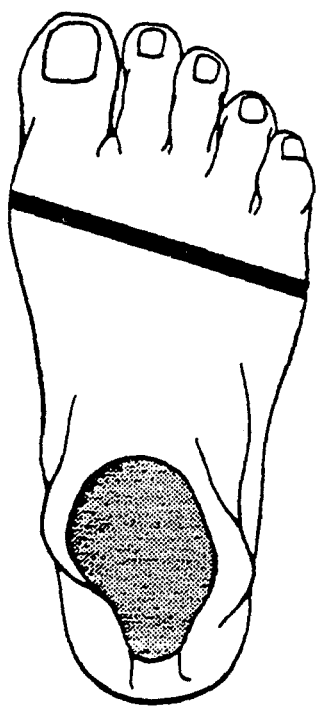
THE SUMMARY STATISTICS

CENTIMETERS		INCHES
25.60	MEAN	10.08
0.02	SE(M)	0.01
1.39	ST DEV	0.55
0.02	SE(SD)	0.01

SYMMETRY--BETA I = 0.26
KURTOSIS--BETA II = 3.44
COEFFICIENT OF VARIATION = 5.45

SAMPLE SIZE = 4095

Table E- 70 BALL OF FOOT CIRC



Ball Of Foot Circumference: Subject stands erect, with his feet slightly apart and with his weight evenly distributed on both feet. The circumference of the right foot is measured. A steel tape is used, with the tape passing over the inner and outer balls of the foot (first and fifth metatarsal- phalangeal joints).

PERCENTILES

CENTIMETERS		INCHES
28.48	99 TH	11.21
28.00	98 TH	11.02
27.71	97 TH	10.91
27.33	95 TH	10.76
26.76	90 TH	10.54
26.39	85 TH	10.39
26.09	80 TH	10.27
25.83	75 TH	10.17
25.60	70 TH	10.08
25.38	65 TH	9.99
25.17	60 TH	9.91
24.96	55 TH	9.83
24.75	50 TH	9.74
24.54	45 TH	9.66
24.32	40 TH	9.57
24.09	35 TH	9.48
23.84	30 TH	9.39
23.57	25 TH	9.28
23.25	20 TH	9.16
22.88	15 TH	9.01
22.40	10 TH	8.82
21.67	5 TH	8.53
21.18	3 RD	8.34
20.82	2 ND	8.20
20.25	1 ST	7.97

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
24.64	MEAN	9.70
0.03	SE(M)	0.01
1.71	ST DEV	0.67
0.02	SE(SD)	0.01

SYMMETRY--BETA I = -0.23
KURTOSIS--BETA II = 3.15
COEFFICIENT OF VARIATION = 6.93

SAMPLE SIZE = 4094

Table E-71 AGE

PERCENTILES

CENTIMETERS		INCHES
25.28	99 TH	25.28
24.25	98 TH	24.25
23.66	97 TH	23.66
22.94	95 TH	22.94
21.99	90 TH	21.99
21.44	85 TH	21.44
21.07	80 TH	21.07
20.77	75 TH	20.77
20.53	70 TH	20.53
20.33	65 TH	20.33
20.15	60 TH	20.15
19.99	55 TH	19.99
19.84	50 TH	19.84
19.70	45 TH	19.70
19.56	40 TH	19.56
19.43	35 TH	19.43
19.29	30 TH	19.29
19.15	25 TH	19.15
19.00	20 TH	19.00
18.82	15 TH	18.82
18.59	10 TH	18.59
18.20	5 TH	18.20
17.91	3 RD	17.91
17.67	2 ND	17.67
17.24	1 ST	17.24

THE SUMMARY STATISTICS

CENTIMETERS		INCHES
19.86	MEAN	19.86
0.02	SE(M)	0.02
1.47	ST DEV	1.47
0.02	SE(SD)	0.02

SYMMETRY--BETA I =	1.50
KURTOSIS--BETA II =	7.45
COEFFICIENT OF VARIATION =	7.39
SAMPLE SIZE =	4095

APPENDIX F

TABLES OF INTERVALS AND FREQUENCIES

Table F-1

Weight

--INTERVALS--			--FREQUENCIES--			
KILOGRAMS		POUNDS	ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
119.98-	123.14	264.50-271.49	1	4091	0.02	100.00
116.80-	119.97	257.50-264.49	1	4090	0.02	99.98
113.63-	116.79	250.50-257.49	0	4089	0.00	99.95
110.45-	113.62	243.50-250.49	3	4089	0.07	99.95
107.28-	110.44	236.50-243.49	3	4086	0.07	99.88
104.10-	107.26	229.50-236.49	6	4083	0.15	99.80
100.93-	104.09	222.50-229.49	23	4077	0.56	99.66
97.75-	100.92	215.50-222.49	32	4054	0.78	99.10
94.58-	97.74	208.50-215.49	57	4022	1.39	98.31
91.40-	94.57	201.50-208.49	65	3965	1.59	96.92
88.22-	91.39	194.50-201.49	134	3900	3.28	95.33
85.05-	88.22	187.50-194.49	145	3766	3.54	92.06
81.88-	85.04	180.50-187.49	194	3621	4.74	88.51
78.70-	81.87	173.50-180.49	290	3427	7.09	83.77
75.53-	78.69	166.50-173.49	316	3137	7.72	76.68
72.35-	75.51	159.50-166.49	475	2821	11.61	68.96
69.18-	72.34	152.50-159.49	436	2346	10.66	57.35
66.00-	69.17	145.51-152.49	514	1910	12.56	46.69
62.83-	65.99	138.51-145.50	555	1396	13.57	34.12
59.65-	62.82	131.51-138.50	400	841	9.78	20.56
56.48-	59.64	124.51-131.50	250	441	6.11	10.78
53.30-	56.47	117.51-124.50	129	191	3.15	4.67
50.13-	53.29	110.51-117.50	39	62	0.95	1.52
46.95-	50.12	103.51-110.50	23	23	0.56	0.56

Table F-2

Stature

--INTERVALS--		--FREQUENCIES--			
CENTIMETERS	INCHES	ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
196.75- 198.74	77.46- 78.24	4	4095	0.10	100.00
194.75- 196.74	76.67- 77.45	5	4091	0.12	99.90
192.75- 194.74	75.89- 76.66	12	4086	0.29	99.78
190.75- 192.74	75.10- 75.88	22	4074	0.54	99.49
188.75- 190.74	74.31- 75.09	65	4052	1.59	98.95
186.75- 188.74	73.52- 74.30	78	3987	1.90	97.36
184.75- 186.74	72.74- 73.51	148	3909	3.61	95.46
182.75- 184.74	71.95- 72.73	198	3761	4.84	91.84
180.75- 182.74	71.16- 71.94	282	3563	6.89	87.01
178.75- 180.74	70.37- 71.15	404	3281	9.87	80.12
176.75- 178.74	69.59- 70.36	450	2877	10.99	70.26
174.75- 176.74	68.80- 69.58	483	2427	11.79	59.27
172.75- 174.74	68.01- 68.79	490	1944	11.97	47.47
170.75- 172.74	67.22- 68.00	450	1454	10.99	35.51
168.75- 170.74	66.44- 67.21	378	1004	9.23	24.52
166.75- 168.74	65.65- 66.43	271	626	6.62	15.29
164.75- 166.74	64.86- 65.64	168	355	4.10	8.67
162.75- 164.74	64.07- 64.85	94	187	2.30	4.57
160.75- 162.74	63.29- 64.06	51	93	1.25	2.27
158.75- 160.74	62.50- 63.28	23	42	0.56	1.03
156.75- 158.74	61.71- 62.49	9	19	0.22	0.46
154.75- 156.74	60.93- 61.70	5	10	0.12	0.24
152.75- 154.74	60.14- 60.92	5	5	0.12	0.12

Table F-3

Cervical Height

--INTERVALS-- CENTIMETERS	--INTERVALS-- INCHES	--FREQUENCIES-- ACTUAL FREQ	--FREQUENCIES-- CUMULATIVE-F	--FREQUENCIES-- PERCENT-FREQ	--FREQUENCIES-- CUMUL-PCT-FQ
170.75- 172.74	67.22- 68.00	3	4095	0.07	100.00
168.75- 170.74	66.44- 67.21	4	4092	0.10	99.93
166.75- 168.74	65.65- 66.43	6	4088	0.15	99.83
164.75- 166.74	64.86- 65.64	26	4082	0.63	99.68
162.75- 164.74	64.07- 64.85	56	4056	1.37	99.05
160.75- 162.74	63.29- 64.06	86	4000	2.10	97.68
158.75- 160.74	62.50- 63.28	143	3914	3.49	95.58
156.75- 158.74	61.71- 62.49	218	3771	5.32	92.09
154.75- 156.74	60.93- 61.70	325	3553	7.94	86.76
152.75- 154.74	60.14- 60.92	399	3228	9.74	78.83
150.75- 152.74	59.35- 60.13	461	2829	11.26	69.08
148.75- 150.74	58.56- 59.34	528	2368	12.89	57.83
146.75- 148.74	57.78- 58.55	486	1840	11.87	44.93
144.75- 146.74	56.99- 57.77	450	1354	10.99	33.06
142.75- 144.74	56.20- 56.98	353	904	8.62	22.08
140.75- 142.74	55.41- 56.19	262	551	6.40	13.46
138.75- 140.74	54.63- 55.40	140	289	3.42	7.06
136.75- 138.74	53.84- 54.62	84	149	2.05	3.64
134.75- 136.74	53.05- 53.83	32	65	0.78	1.59
132.75- 134.74	52.26- 53.04	14	33	0.34	0.81
130.75- 132.74	51.48- 52.25	12	19	0.29	0.46
128.75- 130.74	50.69- 51.47	5	7	0.12	0.17
126.75- 128.74	49.90- 50.68	1	2	0.02	0.05
124.75- 126.74	49.11- 49.89	1	1	0.02	0.02

Table F-4

Shoulder Height

--INTERVALS--		--FREQUENCIES--			
CENTIMETERS	INCHES	ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
166.25- 168.24	65.45- 66.23	1	4095	0.02	100.00
164.25- 166.24	64.67- 65.44	3	4094	0.07	99.98
162.25- 164.24	63.88- 64.66	3	4091	0.07	99.90
160.25- 162.24	63.09- 63.87	14	4088	0.34	99.83
158.25- 160.24	62.30- 63.08	38	4074	0.93	99.49
156.25- 158.24	61.52- 62.29	60	4036	1.47	98.56
154.25- 156.24	60.73- 61.51	115	3976	2.81	97.09
152.25- 154.24	59.94- 60.72	154	3861	3.76	94.29
150.25- 152.24	59.15- 59.93	240	3707	5.86	90.53
148.25- 150.24	58.37- 59.14	345	3467	8.42	84.66
146.25- 148.24	57.58- 58.36	434	3122	10.60	76.24
144.25- 146.24	56.79- 57.57	515	2688	12.58	65.64
142.25- 144.24	56.00- 56.78	495	2173	12.09	53.06
140.25- 142.24	55.22- 55.99	537	1678	13.11	40.98
138.25- 140.24	54.43- 55.21	457	1141	11.16	27.86
136.25- 138.24	53.64- 54.42	274	684	6.69	16.70
134.25- 136.24	52.85- 53.63	205	410	5.01	10.01
132.25- 134.24	52.07- 52.84	100	205	2.44	5.01
130.25- 132.24	51.28- 52.06	52	105	1.27	2.56
128.25- 130.24	50.49- 51.27	34	53	0.83	1.29
126.25- 128.24	49.70- 50.48	13	19	0.32	0.46
124.25- 126.24	48.92- 49.69	1	6	0.02	0.15
122.25- 124.24	48.13- 48.91	5	5	0.12	0.12

Table F-5

Waist Height

--INTERVALS--		--FREQUENCIES--			
CENTIMETERS	INCHES	ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
125.75- 127.74	49.51- 50.29	3	4094	0.07	100.00
123.75- 125.74	48.72- 49.50	2	4091	0.05	99.93
121.75- 123.74	47.93- 48.71	7	4089	0.17	99.88
119.75- 121.74	47.15- 47.92	29	4082	0.71	99.71
117.75- 119.74	46.36- 47.14	46	4053	1.12	99.00
115.75- 117.74	45.57- 46.35	119	4007	2.91	97.87
113.75- 115.74	44.78- 45.56	168	3888	4.10	94.97
111.75- 113.74	44.00- 44.77	283	3720	6.91	90.86
109.75- 111.74	43.21- 43.99	398	3437	9.72	83.95
107.75- 109.74	42.42- 43.20	493	3039	12.04	74.23
105.75- 107.74	41.63- 42.41	563	2546	13.75	62.19
103.75- 105.74	40.85- 41.62	573	1983	14.00	48.44
101.75- 103.74	40.06- 40.84	554	1410	13.53	34.44
99.75- 101.74	39.27- 40.05	379	856	9.26	20.91
97.75- 99.74	38.48- 39.26	195	477	4.76	11.65
95.75- 97.74	37.70- 38.47	143	282	3.49	6.89
93.75- 95.74	36.91- 37.69	79	139	1.93	3.40
91.75- 93.74	36.12- 36.90	44	60	1.07	1.47
89.75- 91.74	35.33- 36.11	12	16	0.29	0.39
87.75- 89.74	34.55- 35.32	2	4	0.05	0.10
85.75- 87.74	33.76- 34.54	2	2	0.05	0.05

Table F-6

Functional Reach

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
96.75-	98.24	38.09-	38.67	4	4089	0.10	100.00
95.25-	96.74	37.50-	38.08	8	4085	0.20	99.90
93.75-	95.24	36.91-	37.49	14	4077	0.34	99.71
92.25-	93.74	36.32-	36.90	26	4063	0.64	99.36
90.75-	92.24	35.73-	36.31	58	4037	1.42	98.73
89.25-	90.74	35.14-	35.72	97	3979	2.37	97.31
87.75-	89.24	34.55-	35.13	184	3882	4.50	94.94
86.25-	87.74	33.96-	34.54	225	3698	5.50	90.44
84.75-	86.24	33.37-	33.95	366	3473	8.95	84.94
83.25-	84.74	32.78-	33.36	419	3107	10.25	75.98
81.75-	83.24	32.19-	32.77	513	2688	12.55	65.74
80.25-	81.74	31.59-	32.18	525	2175	12.84	53.19
78.75-	80.24	31.00-	31.58	527	1650	12.89	40.35
77.25-	78.74	30.41-	30.99	389	1123	9.51	27.46
75.75-	77.24	29.82-	30.40	306	734	7.48	17.95
74.25-	75.74	29.23-	29.81	206	428	5.04	10.47
72.75-	74.24	28.64-	29.22	109	222	2.67	5.43
71.25-	72.74	28.05-	28.63	64	113	1.57	2.76
69.75-	71.24	27.46-	28.04	30	49	0.73	1.20
68.25-	69.74	26.87-	27.45	11	19	0.27	0.46
66.75-	68.24	26.28-	26.86	3	8	0.07	0.20
65.25-	66.74	25.69-	26.27	5	5	0.12	0.12

Table F-7

Crotch Height

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
99.25-	100.74	39.07-	39.66	2	4095	0.05	100.00
97.75-	99.24	38.48-	39.06	5	4093	0.12	99.95
96.25-	97.74	37.89-	38.47	8	4088	0.20	99.83
94.75-	96.24	37.30-	37.88	20	4080	0.49	99.63
93.25-	94.74	36.71-	37.29	44	4060	1.07	99.15
91.75-	93.24	36.12-	36.70	58	4016	1.42	98.07
90.25-	91.74	35.53-	36.11	121	3958	2.95	96.65
88.75-	90.24	34.94-	35.52	199	3837	4.86	93.70
87.25-	88.74	34.35-	34.93	288	3638	7.03	88.84
85.75-	87.24	33.76-	34.34	401	3350	9.79	81.81
84.25-	85.74	33.17-	33.75	502	2949	12.26	72.01
82.75-	84.24	32.58-	33.16	504	2447	12.31	59.76
81.25-	82.74	31.99-	32.57	549	1943	13.41	47.45
79.75-	81.24	31.40-	31.98	495	1394	12.09	34.04
78.25-	79.74	30.81-	31.39	339	899	8.28	21.95
76.75-	78.24	30.22-	30.80	243	560	5.93	13.68
75.25-	76.74	29.63-	30.21	172	317	4.20	7.74
73.75-	75.24	29.04-	29.62	79	145	1.93	3.54
72.25-	73.74	28.44-	29.03	29	66	0.71	1.61
70.75-	72.24	27.85-	28.43	22	37	0.54	0.90
69.25-	70.74	27.26-	27.84	8	15	0.20	0.37
67.75-	69.24	26.67-	27.25	5	7	0.12	0.17
66.25-	67.74	26.08-	26.66	2	2	0.05	0.05

Table F-8

Patella Height, Top

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
63.75-	64.74	25.10-	25.48	3	4095	0.07	100.00
62.75-	63.74	24.70-	25.09	5	4092	0.12	99.93
61.75-	62.74	24.31-	24.69	4	4087	0.10	99.80
60.75-	61.74	23.92-	24.30	18	4083	0.44	99.71
59.75-	60.74	23.52-	23.91	36	4065	0.88	99.27
58.75-	59.74	23.13-	23.51	82	4029	2.00	98.39
57.75-	58.74	22.74-	23.12	104	3947	2.54	96.39
56.75-	57.74	22.34-	22.73	192	3843	4.69	93.85
55.75-	56.74	21.95-	22.33	275	3651	6.72	89.16
54.75-	55.74	21.56-	21.94	389	3376	9.50	82.44
53.75-	54.74	21.16-	21.55	467	2987	11.40	72.94
52.75-	53.74	20.77-	21.15	403	2520	9.84	61.54
51.75-	52.74	20.37-	20.76	574	2117	14.02	51.70
50.75-	51.74	19.98-	20.36	520	1543	12.70	37.68
49.75-	50.74	19.59-	19.97	455	1023	11.11	24.98
48.75-	49.74	19.19-	19.58	219	568	5.35	13.87
47.75-	48.74	18.80-	19.18	176	349	4.30	8.52
46.75-	47.74	18.41-	18.79	90	173	2.20	4.22
45.75-	46.74	18.01-	18.40	51	83	1.25	2.03
44.75-	45.74	17.62-	18.00	20	32	0.49	0.78
43.75-	44.74	17.22-	17.61	9	12	0.22	0.29
42.75-	43.74	16.83-	17.21	3	3	0.07	0.07

Table F-9

Calf Height

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
44.35-	45.14	17.46-	17.77	2	4094	0.05	100.00
43.55-	44.34	17.15-	17.45	12	4092	0.29	99.95
42.75-	43.54	16.83-	17.14	24	4080	0.59	99.66
41.95-	42.74	16.52-	16.82	23	4056	0.56	99.07
41.15-	41.94	16.20-	16.51	47	4033	1.15	98.51
40.35-	41.14	15.89-	16.19	106	3986	2.59	97.36
39.55-	40.34	15.57-	15.88	148	3880	3.62	94.77
38.75-	39.54	15.26-	15.56	288	3732	7.03	91.16
37.95-	38.74	14.94-	15.25	352	3444	8.60	84.12
37.15-	37.94	14.63-	14.93	472	3092	11.53	75.53
36.35-	37.14	14.31-	14.62	445	2620	10.87	64.00
35.55-	36.34	14.00-	14.30	441	2175	10.77	53.13
34.75-	35.54	13.68-	13.99	435	1734	10.63	42.35
33.95-	34.74	13.37-	13.67	408	1299	9.97	31.73
33.15-	33.94	13.05-	13.36	346	891	8.45	21.76
32.35-	33.14	12.74-	13.04	233	545	5.69	13.31
31.55-	32.34	12.42-	12.73	141	312	3.44	7.62
30.75-	31.54	12.11-	12.41	81	171	1.98	4.18
29.95-	30.74	11.79-	12.10	44	90	1.07	2.20
29.15-	29.94	11.48-	11.78	25	46	0.61	1.12
28.35-	29.14	11.16-	11.47	7	21	0.17	0.51
27.55-	28.34	10.85-	11.15	7	14	0.17	0.34
26.75-	27.54	10.53-	10.84	6	7	0.15	0.17
25.95-	26.74	10.22-	10.52	0	1	0.00	0.02
25.15-	25.94	9.90-	10.21	1	1	0.02	0.02

Table F-10

Vertical Reach Sit

--INTERVALS--		--FREQUENCIES--			
CENTIMETERS	INCHES	ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
159.75- 161.74	62.89- 63.67	2	4095	0.05	100.00
157.75- 159.74	62.11- 62.88	6	4093	0.15	99.95
155.75- 157.74	61.32- 62.10	12	4087	0.29	99.80
153.75- 155.74	60.53- 61.31	16	4075	0.39	99.51
151.75- 153.74	59.74- 60.52	18	4059	0.44	99.12
149.75- 151.74	58.96- 59.73	63	4041	1.54	98.68
147.75- 149.74	58.17- 58.95	138	3978	3.37	97.14
145.75- 147.74	57.38- 58.16	204	3840	4.98	93.77
143.75- 145.74	56.59- 57.37	280	3636	6.84	88.79
141.75- 143.74	55.81- 56.58	459	3356	11.21	81.95
139.75- 141.74	55.02- 55.80	524	2897	12.80	70.74
137.75- 139.74	54.23- 55.01	624	2373	15.24	57.95
135.75- 137.74	53.44- 54.22	504	1749	12.31	42.71
133.75- 135.74	52.66- 53.43	468	1245	11.43	30.40
131.75- 133.74	51.87- 52.65	336	777	8.21	18.97
129.75- 131.74	51.08- 51.86	220	441	5.37	10.77
127.75- 129.74	50.30- 51.07	128	221	3.13	5.40
125.75- 127.74	49.51- 50.29	53	93	1.29	2.27
123.75- 125.74	48.72- 49.50	21	40	0.51	0.98
121.75- 123.74	47.93- 48.71	12	19	0.29	0.46
119.75- 121.74	47.15- 47.92	6	7	0.15	0.17
117.75- 119.74	46.36- 47.14	1	1	0.02	0.02

Table F-11

Sitting Height

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
104.25-	105.24	41.04-	41.43	1	4095	0.02	100.00
103.25-	104.24	40.65-	41.03	2	4094	0.05	99.98
102.25-	103.24	40.26-	40.64	3	4092	0.07	99.93
101.25-	102.24	39.86-	40.25	9	4089	0.22	99.85
100.25-	101.24	39.47-	39.85	12	4080	0.29	99.63
99.25-	100.24	39.07-	39.46	22	4068	0.54	99.34
98.25-	99.24	38.68-	39.06	75	4046	1.83	98.80
97.25-	98.24	38.29-	38.67	104	3971	2.54	96.97
96.25-	97.24	37.89-	38.28	133	3867	3.25	94.43
95.25-	96.24	37.50-	37.88	225	3734	5.49	91.18
94.25-	95.24	37.11-	37.49	302	3509	7.37	85.69
93.25-	94.24	36.71-	37.10	386	3207	9.43	78.32
92.25-	93.24	36.32-	36.70	439	2821	10.72	68.89
91.25-	92.24	35.93-	36.31	458	2382	11.18	58.17
90.25-	91.24	35.53-	35.92	457	1924	11.16	46.98
89.25-	90.24	35.14-	35.52	455	1467	11.11	35.82
88.25-	89.24	34.74-	35.13	362	1012	8.84	24.71
87.25-	88.24	34.35-	34.73	243	650	5.93	15.87
86.25-	87.24	33.96-	34.34	179	407	4.37	9.94
85.25-	86.24	33.56-	33.95	98	228	2.39	5.57
84.25-	85.24	33.17-	33.55	65	130	1.59	3.17
83.25-	84.24	32.78-	33.16	39	65	0.95	1.59
82.25-	83.24	32.38-	32.77	13	26	0.32	0.63
81.25-	82.24	31.99-	32.37	10	13	0.24	0.32
80.25-	81.24	31.59-	31.98	2	3	0.05	0.07
79.25-	80.24	31.20-	31.58	1	1	0.02	0.02

Table F-12

Eye Height Sitting

--INTERVALS--				--FREQUENCIES--		
CENTIMETERS		INCHES	ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
90.25-	91.24	35.53- 35.92	3	4095	0.07	100.00
89.25-	90.24	35.14- 35.52	3	4092	0.07	99.93
88.25-	89.24	34.74- 35.13	13	4089	0.32	99.85
87.25-	88.24	34.35- 34.73	24	4076	0.59	99.54
86.25-	87.24	33.96- 34.34	56	4052	1.37	98.95
85.25-	86.24	33.56- 33.95	95	3996	2.32	97.58
84.25-	85.24	33.17- 33.55	186	3901	4.54	95.26
83.25-	84.24	32.78- 33.16	216	3715	5.27	90.72
82.25-	83.24	32.38- 32.77	335	3499	8.18	85.45
81.25-	82.24	31.99- 32.37	423	3164	10.33	77.26
80.25-	81.24	31.59- 31.98	480	2741	11.72	66.94
79.25-	80.24	31.20- 31.58	501	2261	12.23	55.21
78.25-	79.24	30.81- 31.19	467	1760	11.40	42.98
77.25-	78.24	30.41- 30.80	480	1293	11.72	31.58
76.25-	77.24	30.02- 30.40	302	813	7.37	19.85
75.25-	76.24	29.63- 30.01	243	511	5.93	12.48
74.25-	75.24	29.23- 29.62	125	268	3.05	6.54
73.25-	74.24	28.84- 29.22	74	143	1.81	3.49
72.25-	73.24	28.44- 28.83	43	69	1.05	1.68
71.25-	72.24	28.05- 28.43	16	26	0.39	0.63
70.25-	71.24	27.66- 28.04	5	10	0.12	0.24
69.25-	70.24	27.26- 27.65	2	5	0.05	0.12
68.25-	69.24	26.87- 27.25	2	3	0.05	0.07
67.25-	68.24	26.48- 26.86	1	1	0.02	0.02

Table F-13

Mid-Shoulder Height Sitting

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
72.75-	73.74	28.64-	29.03	3	4095	0.07	100.00
71.75-	72.74	28.25-	28.63	7	4092	0.17	99.93
70.75-	71.74	27.85-	28.24	6	4085	0.15	99.76
69.75-	70.74	27.46-	27.84	30	4079	0.73	99.61
68.75-	69.74	27.07-	27.45	52	4049	1.27	98.88
67.75-	68.74	26.67-	27.06	97	3997	2.37	97.61
66.75-	67.74	26.28-	26.66	174	3900	4.25	95.24
65.75-	66.74	25.89-	26.27	281	3726	6.86	90.99
64.75-	65.74	25.49-	25.88	359	3445	8.77	84.13
63.75-	64.74	25.10-	25.48	495	3086	12.09	75.36
62.75-	63.74	24.70-	25.09	498	2591	12.16	63.27
61.75-	62.74	24.31-	24.69	544	2093	13.28	51.11
60.75-	61.74	23.92-	24.30	473	1549	11.55	37.83
59.75-	60.74	23.52-	23.91	472	1076	11.53	26.28
58.75-	59.74	23.13-	23.51	270	604	6.59	14.75
57.75-	58.74	22.74-	23.12	142	334	3.47	8.16
56.75-	57.74	22.34-	22.73	90	192	2.20	4.69
55.75-	56.74	21.95-	22.33	56	102	1.37	2.49
54.75-	55.74	21.56-	21.94	28	46	0.68	1.12
53.75-	54.74	21.16-	21.55	12	18	0.29	0.44
52.75-	53.74	20.77-	21.15	3	6	0.07	0.15
51.75-	52.74	20.37-	20.76	2	3	0.05	0.07
50.75-	51.74	19.98-	20.36	1	1	0.02	0.02

Table F-14

Knee Height Sitting

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
62.75-	63.54	24.70-	25.01	7	4095	0.17	100.00
61.95-	62.74	24.39-	24.69	4	4088	0.10	99.83
61.15-	61.94	24.07-	24.38	9	4084	0.22	99.73
60.35-	61.14	23.76-	24.06	16	4075	0.39	99.51
59.55-	60.34	23.44-	23.75	23	4059	0.56	99.12
58.75-	59.54	23.13-	23.43	70	4036	1.71	98.56
57.95-	58.74	22.81-	23.12	106	3966	2.59	96.85
57.15-	57.94	22.50-	22.80	158	3860	3.86	94.26
56.35-	57.14	22.19-	22.49	246	3702	6.01	90.40
55.55-	56.34	21.87-	22.18	281	3456	6.86	84.40
54.75-	55.54	21.56-	21.86	461	3175	11.26	77.53
53.95-	54.74	21.24-	21.55	447	2714	10.92	66.28
53.15-	53.94	20.93-	21.23	514	2267	12.55	55.36
52.35-	53.14	20.61-	20.92	450	1753	10.99	42.81
51.55-	52.34	20.30-	20.60	397	1303	9.69	31.82
50.75-	51.54	19.98-	20.29	380	906	9.28	22.12
49.95-	50.74	19.67-	19.97	252	526	6.15	12.84
49.15-	49.94	19.35-	19.66	119	274	2.91	6.69
48.35-	49.14	19.04-	19.34	92	155	2.25	3.79
47.55-	48.34	18.72-	19.03	33	63	0.81	1.54
46.75-	47.54	18.41-	18.71	14	30	0.34	0.73
45.95-	46.74	18.09-	18.40	9	16	0.22	0.39
45.15-	45.94	17.78-	18.08	4	7	0.10	0.17
44.35-	45.14	17.46-	17.77	3	3	0.07	0.07

Table F-15

Popliteal Height

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
53.05-	53.74	20.89-	21.15	2	4095	0.05	100.00
52.35-	53.04	20.61-	20.88	1	4093	0.02	99.95
51.65-	52.34	20.33-	20.60	1	4092	0.02	99.93
50.95-	51.64	20.06-	20.32	0	4091	0.00	99.90
50.25-	50.94	19.78-	20.05	14	4091	0.34	99.90
49.55-	50.24	19.51-	19.77	17	4077	0.42	99.56
48.85-	49.54	19.23-	19.50	56	4060	1.37	99.15
48.15-	48.84	18.96-	19.22	55	4004	1.34	97.78
47.45-	48.14	18.68-	18.95	116	3949	2.83	96.43
46.75-	47.44	18.41-	18.67	200	3833	4.88	93.60
46.05-	46.74	18.13-	18.40	270	3633	6.59	88.72
45.35-	46.04	17.85-	18.12	355	3363	8.67	82.12
44.65-	45.34	17.58-	17.84	479	3008	11.70	73.46
43.95-	44.64	17.30-	17.57	396	2529	9.67	61.76
43.25-	43.94	17.03-	17.29	463	2133	11.31	52.09
42.55-	43.24	16.75-	17.02	341	1670	8.33	40.78
41.85-	42.54	16.48-	16.74	355	1329	8.67	32.45
41.15-	41.84	16.20-	16.47	271	974	6.62	23.79
40.45-	41.14	15.93-	16.19	269	703	6.57	17.17
39.75-	40.44	15.65-	15.92	198	434	4.84	10.60
39.05-	39.74	15.37-	15.64	123	236	3.00	5.76
38.35-	39.04	15.10-	15.36	64	113	1.56	2.76
37.65-	38.34	14.82-	15.09	38	49	0.93	1.20
36.95-	37.64	14.55-	14.81	6	11	0.15	0.27
36.25-	36.94	14.27-	14.54	5	5	0.12	0.12

Table F-16

Chest Depth

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
31.05-	31.64	12.22-	12.45	1	4095	0.02	100.00
30.45-	31.04	11.99-	12.21	1	4094	0.02	99.98
29.85-	30.44	11.75-	11.98	0	4093	0.00	99.95
29.25-	29.84	11.52-	11.74	5	4093	0.12	99.95
28.65-	29.24	11.28-	11.51	8	4088	0.20	99.83
28.05-	28.64	11.04-	11.27	15	4080	0.37	99.63
27.45-	28.04	10.81-	11.03	30	4065	0.73	99.27
26.85-	27.44	10.57-	10.80	53	4035	1.29	98.53
26.25-	26.84	10.33-	10.56	91	3982	2.22	97.24
25.65-	26.24	10.10-	10.32	101	3891	2.47	95.02
25.05-	25.64	9.86-	10.09	184	3790	4.49	92.55
24.45-	25.04	9.63-	9.85	276	3606	6.74	88.06
23.85-	24.44	9.39-	9.62	335	3330	8.18	81.32
23.25-	23.84	9.15-	9.38	391	2995	9.55	73.14
22.65-	23.24	8.92-	9.14	560	2604	13.68	63.59
22.05-	22.64	8.68-	8.91	555	2044	13.55	49.91
21.45-	22.04	8.44-	8.67	480	1489	11.72	36.36
20.85-	21.44	8.21-	8.43	400	1009	9.77	24.64
20.25-	20.84	7.97-	8.20	294	609	7.18	14.87
19.65-	20.24	7.74-	7.96	197	315	4.81	7.69
19.05-	19.64	7.50-	7.73	68	118	1.66	2.88
18.45-	19.04	7.26-	7.49	26	50	0.63	1.22
17.85-	18.44	7.03-	7.25	22	24	0.54	0.59
17.25-	17.84	6.79-	7.02	2	2	0.05	0.05

Table F-17

Chest Breadth

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
38.55-	39.24	15.18-	15.44	2	4095	0.05	100.00
37.85-	38.54	14.90-	15.17	5	4093	0.12	99.95
37.15-	37.84	14.63-	14.89	1	4088	0.02	99.83
36.45-	37.14	14.35-	14.62	10	4087	0.24	99.80
35.75-	36.44	14.07-	14.34	17	4077	0.42	99.56
35.05-	35.74	13.80-	14.06	37	4060	0.90	99.15
34.35-	35.04	13.52-	13.79	70	4023	1.71	98.24
33.65-	34.34	13.25-	13.51	87	3953	2.12	96.53
32.95-	33.64	12.97-	13.24	132	3866	3.22	94.41
32.25-	32.94	12.70-	12.96	249	3734	6.08	91.18
31.55-	32.24	12.42-	12.69	336	3485	8.21	85.10
30.85-	31.54	12.15-	12.41	475	3149	11.60	76.90
30.15-	30.84	11.87-	12.14	547	2674	13.36	65.30
29.45-	30.14	11.59-	11.86	554	2127	13.53	51.94
28.75-	29.44	11.32-	11.58	527	1573	12.87	38.41
28.05-	28.74	11.04-	11.31	450	1046	10.99	25.54
27.35-	28.04	10.77-	11.03	272	596	6.64	14.55
26.65-	27.34	10.49-	10.76	179	324	4.37	7.91
25.95-	26.64	10.22-	10.48	111	145	2.71	3.54
25.25-	25.94	9.94-	10.21	27	34	0.66	0.83
24.55-	25.24	9.67-	9.93	4	7	0.10	0.17
23.85-	24.54	9.39-	9.66	3	3	0.07	0.07

Table F-18

Hip Breadth

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
41.55-	42.24	16.36-	16.62	2	4094	0.05	100.00
40.85-	41.54	16.08-	16.35	1	4092	0.02	99.95
40.15-	40.84	15.81-	16.07	3	4091	0.07	99.93
39.45-	40.14	15.53-	15.80	7	4088	0.17	99.85
38.75-	39.44	15.26-	15.52	17	4081	0.42	99.68
38.05-	38.74	14.98-	15.25	33	4064	0.81	99.27
37.35-	38.04	14.70-	14.97	55	4031	1.34	98.46
36.65-	37.34	14.43-	14.69	106	3976	2.59	97.12
35.95-	36.64	14.15-	14.42	160	3870	3.91	94.53
35.25-	35.94	13.88-	14.14	187	3710	4.57	90.62
34.55-	35.24	13.60-	13.87	327	3523	7.99	86.05
33.85-	34.54	13.33-	13.59	398	3196	9.72	78.07
33.15-	33.84	13.05-	13.32	535	2798	13.07	68.34
32.45-	33.14	12.78-	13.04	587	2263	14.34	55.28
31.75-	32.44	12.50-	12.77	583	1676	14.24	40.94
31.05-	31.74	12.22-	12.49	453	1093	11.06	26.70
30.35-	31.04	11.95-	12.21	349	640	8.52	15.63
29.65-	30.34	11.67-	11.94	166	291	4.05	7.11
28.95-	29.64	11.40-	11.66	87	125	2.13	3.05
28.25-	28.94	11.12-	11.39	25	38	0.61	0.93
27.55-	28.24	10.85-	11.11	11	13	0.27	0.32
26.85-	27.54	10.57-	10.84	1	2	0.02	0.05
26.15-	26.84	10.30-	10.56	1	1	0.02	0.02

Table F-19

Ociput-Ex Canthus

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
20.25-	20.54	7.97-	8.08	3	4095	0.07	100.00
19.95-	20.24	7.85-	7.96	7	4092	0.17	99.93
19.65-	19.94	7.74-	7.84	16	4085	0.39	99.76
19.35-	19.64	7.62-	7.73	50	4069	1.22	99.37
19.05-	19.34	7.50-	7.61	82	4019	2.00	98.14
18.75-	19.04	7.38-	7.49	144	3937	3.52	96.14
18.45-	18.74	7.26-	7.37	205	3793	5.01	92.63
18.15-	18.44	7.15-	7.25	322	3588	7.86	87.62
17.85-	18.14	7.03-	7.14	366	3266	8.94	79.76
17.55-	17.84	6.91-	7.02	375	2900	9.16	70.82
17.25-	17.54	6.79-	6.90	367	2525	8.96	61.66
16.95-	17.24	6.67-	6.78	368	2158	8.99	52.70
16.65-	16.94	6.56-	6.66	398	1790	9.72	43.71
16.35-	16.64	6.44-	6.55	417	1392	10.18	33.99
16.05-	16.34	6.32-	6.43	344	975	8.40	23.81
15.75-	16.04	6.20-	6.31	286	631	6.98	15.41
15.45-	15.74	6.08-	6.19	163	345	3.98	8.42
15.15-	15.44	5.96-	6.07	111	182	2.71	4.44
14.85-	15.14	5.85-	5.95	52	71	1.27	1.73
14.55-	14.84	5.73-	5.84	15	19	0.37	0.46
14.25-	14.54	5.61-	5.72	3	4	0.07	0.10
13.95-	14.24	5.49-	5.60	1	1	0.02	0.02

Table F-20

Ociput Tragion

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
14.35-	14.74	5.65-	5.80	2	4095	0.05	100.00
13.95-	14.34	5.49-	5.64	7	4093	0.17	99.95
13.55-	13.94	5.33-	5.48	10	4086	0.24	99.78
13.15-	13.54	5.18-	5.32	26	4076	0.63	99.54
12.75-	13.14	5.02-	5.17	107	4050	2.61	98.90
12.35-	12.74	4.86-	5.01	182	3943	4.44	96.29
11.95-	12.34	4.70-	4.85	319	3761	7.79	91.84
11.55-	11.94	4.55-	4.69	452	3442	11.04	84.05
11.15-	11.54	4.39-	4.54	393	2990	9.60	73.02
10.75-	11.14	4.23-	4.38	263	2597	6.42	63.42
10.35-	10.74	4.07-	4.22	276	2334	6.74	57.00
9.95-	10.34	3.92-	4.06	310	2058	7.57	50.26
9.55-	9.94	3.76-	3.91	452	1748	11.04	42.69
9.15-	9.54	3.60-	3.75	512	1296	12.50	31.65
8.75-	9.14	3.44-	3.59	418	784	10.21	19.15
8.35-	8.74	3.29-	3.43	218	366	5.32	8.94
7.95-	8.34	3.13-	3.28	101	148	2.47	3.61
7.55-	7.94	2.97-	3.12	39	47	0.95	1.15
7.15-	7.54	2.81-	2.96	7	8	0.17	0.20
6.75-	7.14	2.66-	2.80	1	1	0.02	0.02

Table F-21

Head Height

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
16.45-	16.74	6.48-	6.58	1	4095	0.02	100.00
16.15-	16.44	6.36-	6.47	0	4094	0.00	99.98
15.85-	16.14	6.24-	6.35	4	4094	0.10	99.98
15.55-	15.84	6.12-	6.23	11	4090	0.27	99.88
15.25-	15.54	6.00-	6.11	54	4079	1.32	99.61
14.95-	15.24	5.89-	5.99	90	4025	2.20	98.29
14.65-	14.94	5.77-	5.88	236	3935	5.76	96.09
14.35-	14.64	5.65-	5.76	345	3699	8.42	90.33
14.05-	14.34	5.53-	5.64	484	3354	11.82	81.90
13.75-	14.04	5.41-	5.52	487	2870	11.89	70.09
13.45-	13.74	5.30-	5.40	477	2383	11.65	58.19
13.15-	13.44	5.18-	5.29	550	1906	13.43	46.54
12.85-	13.14	5.06-	5.17	434	1356	10.60	33.11
12.55-	12.84	4.94-	5.05	401	922	9.79	22.52
12.25-	12.54	4.82-	4.93	250	521	6.11	12.72
11.95-	12.24	4.70-	4.81	138	271	3.37	6.62
11.65-	11.94	4.59-	4.69	84	133	2.05	3.25
11.35-	11.64	4.47-	4.58	30	49	0.73	1.20
11.05-	11.34	4.35-	4.46	16	19	0.39	0.46
10.75-	11.04	4.23-	4.34	3	3	0.07	0.07

Table F-22

Shoulder-Elbow Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
43.05-	43.64	16.95-	17.18	1	4095	0.02	100.00
42.45-	43.04	16.71-	16.94	1	4094	0.02	99.98
41.85-	42.44	16.48-	16.70	10	4093	0.24	99.95
41.25-	41.84	16.24-	16.47	32	4083	0.78	99.71
40.65-	41.24	16.00-	16.23	51	4051	1.25	98.93
40.05-	40.64	15.77-	15.99	81	4000	1.98	97.68
39.45-	40.04	15.53-	15.76	145	3919	3.54	95.70
38.85-	39.44	15.30-	15.52	243	3774	5.93	92.16
38.25-	38.84	15.06-	15.29	365	3531	8.91	86.23
37.65-	38.24	14.82-	15.05	435	3166	10.62	77.31
37.05-	37.64	14.59-	14.81	522	2731	12.75	66.69
36.45-	37.04	14.35-	14.58	520	2209	12.70	53.94
35.85-	36.44	14.11-	14.34	500	1689	12.21	41.25
35.25-	35.84	13.88-	14.10	413	1189	10.09	29.04
34.65-	35.24	13.64-	13.87	318	776	7.77	18.95
34.05-	34.64	13.41-	13.63	207	458	5.05	11.18
33.45-	34.04	13.17-	13.40	130	251	3.17	6.13
32.85-	33.44	12.93-	13.16	71	121	1.73	2.95
32.25-	32.84	12.70-	12.92	29	50	0.71	1.22
31.65-	32.24	12.46-	12.69	14	21	0.34	0.51
31.05-	31.64	12.22-	12.45	3	7	0.07	0.17
30.45-	31.04	11.99-	12.21	4	4	0.10	0.10

Table F-23

Forearm-Hand Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
54.95-	55.54	21.63-	21.86	1	4095	0.02	100.00
54.35-	54.94	21.40-	21.62	4	4094	0.10	99.98
53.75-	54.34	21.16-	21.39	8	4090	0.20	99.88
53.15-	53.74	20.93-	21.15	25	4082	0.61	99.68
52.55-	53.14	20.69-	20.92	28	4057	0.68	99.07
51.95-	52.54	20.45-	20.68	57	4029	1.39	98.39
51.35-	51.94	20.22-	20.44	77	3972	1.88	97.00
50.75-	51.34	19.98-	20.21	108	3895	2.64	95.12
50.15-	50.74	19.74-	19.97	183	3787	4.47	92.48
49.55-	50.14	19.51-	19.73	257	3604	6.28	88.01
48.95-	49.54	19.27-	19.50	364	3347	8.89	81.73
48.35-	48.94	19.04-	19.26	360	2983	8.79	72.84
47.75-	48.34	18.80-	19.03	448	2623	10.94	64.05
47.15-	47.74	18.56-	18.79	485	2175	11.84	53.11
46.55-	47.14	18.33-	18.55	448	1690	10.94	41.27
45.95-	46.54	18.09-	18.32	393	1242	9.60	30.33
45.35-	45.94	17.85-	18.08	290	849	7.08	20.73
44.75-	45.34	17.62-	17.84	208	559	5.08	13.65
44.15-	44.74	17.38-	17.61	152	351	3.71	8.57
43.55-	44.14	17.15-	17.37	103	199	2.52	4.86
42.95-	43.54	16.91-	17.14	59	96	1.44	2.34
42.35-	42.94	16.67-	16.90	21	37	0.51	0.90
41.75-	42.34	16.44-	16.66	7	16	0.17	0.39
41.15-	41.74	16.20-	16.43	6	9	0.15	0.22
40.55-	41.14	15.96-	16.19	3	3	0.07	0.07

Table F-24

Buttock-Knee Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
69.75-	70.74	27.46-	27.84	1	4095	0.02	100.00
68.75-	69.74	27.07-	27.45	2	4094	0.05	99.98
67.75-	68.74	26.67-	27.06	3	4092	0.07	99.93
66.75-	67.74	26.28-	26.66	19	4089	0.46	99.85
65.75-	66.74	25.89-	26.27	19	4070	0.46	99.39
64.75-	65.74	25.49-	25.88	53	4051	1.29	98.93
63.75-	64.74	25.10-	25.48	108	3998	2.64	97.63
62.75-	63.74	24.70-	25.09	179	3890	4.37	94.99
61.75-	62.74	24.31-	24.69	333	3711	8.13	90.62
60.75-	61.74	23.92-	24.30	435	3378	10.62	82.49
59.75-	60.74	23.52-	23.91	565	2943	13.80	71.87
58.75-	59.74	23.13-	23.51	571	2378	13.94	58.07
57.75-	58.74	22.74-	23.12	613	1807	14.97	44.13
56.75-	57.74	22.34-	22.73	434	1194	10.60	29.16
55.75-	56.74	21.95-	22.33	325	760	7.94	18.56
54.75-	55.74	21.56-	21.94	234	435	5.71	10.62
53.75-	54.74	21.16-	21.55	125	201	3.05	4.91
52.75-	53.74	20.77-	21.15	47	76	1.15	1.86
51.75-	52.74	20.37-	20.76	16	29	0.39	0.71
50.75-	51.74	19.98-	20.36	7	13	0.17	0.32
49.75-	50.74	19.59-	19.97	6	6	0.15	0.15

Table F-25

Buttock-Popliteal Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
58.45-	59.14	23.01-	23.28	2	4095	0.05	100.00
57.75-	58.44	22.74-	23.00	0	4093	0.00	99.95
57.05-	57.74	22.46-	22.73	4	4093	0.10	99.95
56.35-	57.04	22.19-	22.45	4	4089	0.10	99.85
55.65-	56.34	21.91-	22.18	4	4085	0.10	99.76
54.95-	55.64	21.63-	21.90	11	4081	0.27	99.66
54.25-	54.94	21.36-	21.62	35	4070	0.85	99.39
53.55-	54.24	21.08-	21.35	54	4035	1.32	98.53
52.85-	53.54	20.81-	21.07	85	3981	2.08	97.22
52.15-	52.84	20.53-	20.80	171	3896	4.18	95.14
51.45-	52.14	20.26-	20.52	217	3725	5.30	90.96
50.75-	51.44	19.98-	20.25	309	3508	7.55	85.67
50.05-	50.74	19.70-	19.97	401	3199	9.79	78.12
49.35-	50.04	19.43-	19.69	414	2798	10.11	68.33
48.65-	49.34	19.15-	19.42	497	2384	12.14	58.22
47.95-	48.64	18.88-	19.14	478	1887	11.67	46.08
47.25-	47.94	18.60-	18.87	435	1409	10.62	34.41
46.55-	47.24	18.33-	18.59	362	974	8.84	23.79
45.85-	46.54	18.05-	18.32	261	612	6.37	14.95
45.15-	45.84	17.78-	18.04	153	351	3.74	8.57
44.45-	45.14	17.50-	17.77	103	198	2.52	4.84
43.75-	44.44	17.22-	17.49	55	95	1.34	2.32
43.05-	43.74	16.95-	17.21	25	40	0.61	0.98
42.35-	43.04	16.67-	16.94	8	15	0.20	0.37
41.65-	42.34	16.40-	16.66	3	7	0.07	0.17
40.95-	41.64	16.12-	16.39	4	4	0.10	0.10

Table F-26

Bideltoid Diameter

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
53.75-	54.54	21.16-	21.47	3	4095	0.07	100.00
52.95-	53.74	20.85-	21.15	8	4092	0.20	99.93
52.15-	52.94	20.53-	20.84	12	4084	0.29	99.73
51.35-	52.14	20.22-	20.52	18	4072	0.44	99.44
50.55-	51.34	19.90-	20.21	45	4054	1.10	99.00
49.75-	50.54	19.59-	19.89	68	4009	1.66	97.90
48.95-	49.74	19.27-	19.58	117	3941	2.86	96.24
48.15-	48.94	18.96-	19.26	194	3824	4.74	93.38
47.35-	48.14	18.64-	18.95	219	3630	5.35	88.64
46.55-	47.34	18.33-	18.63	351	3411	8.57	83.30
45.75-	46.54	18.01-	18.32	432	3060	10.55	74.73
44.95-	45.74	17.70-	18.00	506	2628	12.36	64.18
44.15-	44.94	17.38-	17.69	505	2122	12.33	51.82
43.35-	44.14	17.07-	17.37	479	1617	11.70	39.49
42.55-	43.34	16.75-	17.06	424	1138	10.35	27.79
41.75-	42.54	16.44-	16.74	314	714	7.67	17.44
40.95-	41.74	16.12-	16.43	188	400	4.59	9.77
40.15-	40.94	15.81-	16.11	110	212	2.69	5.18
39.35-	40.14	15.49-	15.80	56	102	1.37	2.49
38.55-	39.34	15.18-	15.48	31	46	0.76	1.12
37.75-	38.54	14.86-	15.17	9	15	0.22	0.37
36.95-	37.74	14.55-	14.85	6	6	0.15	0.15

Table F-27

Max Forearm-Forearm Breadth

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
63.25-	64.74	24.90-	25.48	1	4094	0.02	100.00
61.75-	63.24	24.31-	24.89	5	4093	0.12	99.98
60.25-	61.74	23.72-	24.30	5	4088	0.12	99.85
58.75-	60.24	23.13-	23.71	15	4083	0.37	99.73
57.25-	58.74	22.54-	23.12	31	4068	0.76	99.36
55.75-	57.24	21.95-	22.53	34	4037	0.83	98.61
54.25-	55.74	21.36-	21.94	84	4003	2.05	97.78
52.75-	54.24	20.77-	21.35	130	3919	3.18	95.73
51.25-	52.74	20.18-	20.76	185	3789	4.52	92.55
49.75-	51.24	19.59-	20.17	255	3604	6.23	88.03
48.25-	49.74	19.00-	19.58	317	3349	7.74	81.80
46.75-	48.24	18.41-	18.99	378	3032	9.23	74.06
45.25-	46.74	17.81-	18.40	494	2654	12.07	64.83
43.75-	45.24	17.22-	17.80	562	2160	13.73	52.76
42.25-	43.74	16.63-	17.21	575	1598	14.04	39.03
40.75-	42.24	16.04-	16.62	466	1023	11.38	24.99
39.25-	40.74	15.45-	16.03	328	557	8.01	13.61
37.75-	39.24	14.86-	15.44	152	229	3.71	5.59
36.25-	37.74	14.27-	14.85	60	77	1.47	1.88
34.75-	36.24	13.68-	14.26	13	17	0.32	0.42
33.25-	34.74	13.09-	13.67	4	4	0.10	0.10

Table F-28

Hip Breadth Sitting

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
45.05-	45.84	17.74-	18.04	1	4094	0.02	100.00
44.25-	45.04	17.42-	17.73	0	4093	0.00	99.98
43.45-	44.24	17.11-	17.41	2	4093	0.05	99.98
42.65-	43.44	16.79-	17.10	3	4091	0.07	99.93
41.85-	42.64	16.48-	16.78	4	4088	0.10	99.85
41.05-	41.84	16.16-	16.47	10	4084	0.24	99.76
40.25-	41.04	15.85-	16.15	22	4074	0.54	99.51
39.45-	40.24	15.53-	15.84	42	4052	1.03	98.97
38.65-	39.44	15.22-	15.52	60	4010	1.47	97.95
37.85-	38.64	14.90-	15.21	115	3950	2.81	96.48
37.05-	37.84	14.59-	14.89	155	3835	3.79	93.67
36.25-	37.04	14.27-	14.58	208	3680	5.08	89.89
35.45-	36.24	13.96-	14.26	316	3472	7.72	84.81
34.65-	35.44	13.64-	13.95	398	3156	9.72	77.09
33.85-	34.64	13.33-	13.63	503	2758	12.29	67.37
33.05-	33.84	13.01-	13.32	601	2255	14.68	55.08
32.25-	33.04	12.70-	13.00	579	1654	14.14	40.40
31.45-	32.24	12.38-	12.69	488	1075	11.92	26.26
30.65-	31.44	12.07-	12.37	343	587	8.38	14.34
29.85-	30.64	11.75-	12.06	165	244	4.03	5.96
29.05-	29.84	11.44-	11.74	49	79	1.20	1.93
28.25-	29.04	11.12-	11.43	24	30	0.59	0.73
27.45-	28.24	10.81-	11.11	6	6	0.15	0.15

Table F-29

Bizygomatic Diameter

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
16.15-	16.34	6.36-	6.43	2	4095	0.05	100.00
15.95-	16.14	6.28-	6.35	0	4093	0.00	99.95
15.75-	15.94	6.20-	6.27	4	4093	0.10	99.95
15.55-	15.74	6.12-	6.19	10	4089	0.24	99.85
15.35-	15.54	6.04-	6.11	17	4079	0.42	99.61
15.15-	15.34	5.96-	6.03	54	4062	1.32	99.19
14.95-	15.14	5.89-	5.95	60	4008	1.47	97.88
14.75-	14.94	5.81-	5.88	148	3948	3.61	96.41
14.55-	14.74	5.73-	5.80	265	3800	6.47	92.80
14.35-	14.54	5.65-	5.72	285	3535	6.96	86.32
14.15-	14.34	5.57-	5.64	643	3250	15.70	79.37
13.95-	14.14	5.49-	5.56	362	2607	8.84	63.66
13.75-	13.94	5.41-	5.48	724	2245	17.68	54.82
13.55-	13.74	5.33-	5.40	607	1521	14.82	37.14
13.35-	13.54	5.26-	5.32	339	914	8.28	22.32
13.15-	13.34	5.18-	5.25	327	575	7.99	14.04
12.95-	13.14	5.10-	5.17	92	248	2.25	6.06
12.75-	12.94	5.02-	5.09	102	156	2.49	3.81
12.55-	12.74	4.94-	5.01	39	54	0.95	1.32
12.35-	12.54	4.86-	4.93	10	15	0.24	0.37
12.15-	12.34	4.78-	4.85	3	5	0.07	0.12
11.95-	12.14	4.70-	4.77	2	2	0.05	0.05

Table F-30

Bitragion Diameter

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
15.35-	15.54	6.04-	6.11	3	4095	0.07	100.00
15.15-	15.34	5.96-	6.03	2	4092	0.05	99.93
14.95-	15.14	5.89-	5.95	4	4090	0.10	99.88
14.75-	14.94	5.81-	5.88	15	4086	0.37	99.78
14.55-	14.74	5.73-	5.80	50	4071	1.22	99.41
14.35-	14.54	5.65-	5.72	89	4021	2.17	98.19
14.15-	14.34	5.57-	5.64	162	3932	3.96	96.02
13.95-	14.14	5.49-	5.56	204	3770	4.98	92.06
13.75-	13.94	5.41-	5.48	453	3566	11.06	87.08
13.55-	13.74	5.33-	5.40	552	3113	13.48	76.02
13.35-	13.54	5.26-	5.32	547	2561	13.36	62.54
13.15-	13.34	5.18-	5.25	670	2014	16.36	49.18
12.95-	13.14	5.10-	5.17	468	1344	11.43	32.82
12.75-	12.94	5.02-	5.09	424	876	10.35	21.39
12.55-	12.74	4.94-	5.01	243	452	5.93	11.04
12.35-	12.54	4.86-	4.93	124	209	3.03	5.10
12.15-	12.34	4.78-	4.85	55	85	1.34	2.08
11.95-	12.14	4.70-	4.77	22	30	0.54	0.73
11.75-	11.94	4.63-	4.69	6	8	0.15	0.20
11.55-	11.74	4.55-	4.62	2	2	0.05	0.05

Table F-31

Head Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
21.85-	22.14	8.60-	8.71	1	4095	0.02	100.00
21.55-	21.84	8.48-	8.59	10	4094	0.24	99.98
21.25-	21.54	8.37-	8.47	16	4084	0.39	99.73
20.95-	21.24	8.25-	8.36	37	4068	0.90	99.34
20.65-	20.94	8.13-	8.24	120	4031	2.93	98.44
20.35-	20.64	8.01-	8.12	224	3911	5.47	95.51
20.05-	20.34	7.89-	8.00	431	3687	10.53	90.04
19.75-	20.04	7.78-	7.88	465	3256	11.36	79.51
19.45-	19.74	7.66-	7.77	610	2791	14.90	68.16
19.15-	19.44	7.54-	7.65	777	2181	18.97	53.26
18.85-	19.14	7.42-	7.53	564	1404	13.77	34.29
18.55-	18.84	7.30-	7.41	404	840	9.87	20.51
18.25-	18.54	7.19-	7.29	225	436	5.49	10.65
17.95-	18.24	7.07-	7.18	107	211	2.61	5.15
17.65-	17.94	6.95-	7.06	74	104	1.81	2.54
17.35-	17.64	6.83-	6.94	21	30	0.51	0.73
17.05-	17.34	6.71-	6.82	8	9	0.20	0.22
16.75-	17.04	6.59-	6.70	1	1	0.02	0.02

Table F-32

Occiput-Nasal Root

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
21.35-	21.54	8.41-	8.47	2	4095	0.05	100.00
21.15-	21.34	8.33-	8.40	7	4093	0.17	99.95
20.95-	21.14	8.25-	8.32	7	4086	0.17	99.78
20.75-	20.94	8.17-	8.24	20	4079	0.49	99.61
20.55-	20.74	8.09-	8.16	31	4059	0.76	99.12
20.35-	20.54	8.01-	8.08	66	4028	1.61	98.36
20.15-	20.34	7.93-	8.00	113	3962	2.76	96.75
19.95-	20.14	7.85-	7.92	128	3849	3.13	93.99
19.75-	19.94	7.78-	7.84	230	3721	5.62	90.87
19.55-	19.74	7.70-	7.77	399	3491	9.74	85.25
19.35-	19.54	7.62-	7.69	385	3092	9.40	75.51
19.15-	19.34	7.54-	7.61	439	2707	10.72	66.11
18.95-	19.14	7.46-	7.53	419	2268	10.23	55.38
18.75-	18.94	7.38-	7.45	401	1849	9.79	45.15
18.55-	18.74	7.30-	7.37	473	1448	11.55	35.36
18.35-	18.54	7.22-	7.29	323	975	7.89	23.81
18.15-	18.34	7.15-	7.21	245	652	5.98	15.92
17.95-	18.14	7.07-	7.14	147	407	3.59	9.94
17.75-	17.94	6.99-	7.06	107	260	2.61	6.35
17.55-	17.74	6.91-	6.98	79	153	1.93	3.74
17.35-	17.54	6.83-	6.90	35	74	0.85	1.81
17.15-	17.34	6.75-	6.82	21	39	0.51	0.95
16.95-	17.14	6.67-	6.74	7	18	0.17	0.44
16.75-	16.94	6.59-	6.66	7	11	0.17	0.27
16.55-	16.74	6.52-	6.58	4	4	0.10	0.10

Table F-33

Occiput-Pronasale

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
24.45-	24.74	9.63-	9.73	4	4095	0.10	100.00
24.15-	24.44	9.51-	9.62	9	4091	0.22	99.90
23.85-	24.14	9.39-	9.50	25	4082	0.61	99.68
23.55-	23.84	9.27-	9.38	86	4057	2.10	99.07
23.25-	23.54	9.15-	9.26	131	3971	3.20	96.97
22.95-	23.24	9.04-	9.14	232	3840	5.67	93.77
22.65-	22.94	8.92-	9.03	480	3608	11.72	88.11
22.35-	22.64	8.80-	8.91	505	3128	12.33	76.39
22.05-	22.34	8.68-	8.79	617	2623	15.07	64.05
21.75-	22.04	8.56-	8.67	531	2006	12.97	48.99
21.45-	21.74	8.44-	8.55	514	1475	12.55	36.02
21.15-	21.44	8.33-	8.43	478	961	11.67	23.47
20.85-	21.14	8.21-	8.32	216	483	5.27	11.79
20.55-	20.84	8.09-	8.20	143	267	3.49	6.52
20.25-	20.54	7.97-	8.08	68	124	1.66	3.03
19.95-	20.24	7.85-	7.96	29	56	0.71	1.37
19.65-	19.94	7.74-	7.84	15	27	0.37	0.66
19.35-	19.64	7.62-	7.73	6	12	0.15	0.29
19.05-	19.34	7.50-	7.61	4	6	0.10	0.15
18.75-	19.04	7.38-	7.49	2	2	0.05	0.05

Table F-34

Head Breadth

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
17.25-	17.44	6.79-	6.86	2	4095	0.05	100.00
17.05-	17.24	6.71-	6.78	9	4093	0.22	99.95
16.85-	17.04	6.63-	6.70	7	4084	0.17	99.73
16.65-	16.84	6.56-	6.62	24	4077	0.59	99.56
16.45-	16.64	6.48-	6.55	26	4053	0.63	98.97
16.25-	16.44	6.40-	6.47	122	4027	2.98	98.34
16.05-	16.24	6.32-	6.39	160	3905	3.91	95.36
15.85-	16.04	6.24-	6.31	187	3745	4.57	91.45
15.65-	15.84	6.16-	6.23	468	3558	11.43	86.89
15.45-	15.64	6.08-	6.15	256	3090	6.25	75.46
15.25-	15.44	6.00-	6.07	755	2834	18.44	69.21
15.05-	15.24	5.93-	5.99	575	2079	14.04	50.77
14.85-	15.04	5.85-	5.92	426	1504	10.40	36.73
14.65-	14.84	5.77-	5.84	484	1078	11.82	26.32
14.45-	14.64	5.69-	5.76	231	594	5.64	14.51
14.25-	14.44	5.61-	5.68	216	363	5.27	8.86
14.05-	14.24	5.53-	5.60	105	147	2.56	3.59
13.85-	14.04	5.45-	5.52	17	42	0.42	1.03
13.65-	13.84	5.37-	5.44	20	25	0.49	0.61
13.45-	13.64	5.30-	5.36	1	5	0.02	0.12
13.25-	13.44	5.22-	5.29	4	4	0.10	0.10

Table F-35

Interpupilary Distance

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
7.55-	7.74	2.97-	3.04	1	4095	0.02	100.00
7.35-	7.54	2.89-	2.96	3	4094	0.07	99.98
7.15-	7.34	2.81-	2.88	5	4091	0.12	99.90
6.95-	7.14	2.74-	2.80	17	4086	0.42	99.78
6.75-	6.94	2.66-	2.73	92	4069	2.25	99.37
6.55-	6.74	2.58-	2.65	236	3977	5.76	97.12
6.35-	6.54	2.50-	2.57	506	3741	12.36	91.36
6.15-	6.34	2.42-	2.49	1052	3235	25.69	79.00
5.95-	6.14	2.34-	2.41	842	2183	20.56	53.31
5.75-	5.94	2.26-	2.33	808	1341	19.73	32.75
5.55-	5.74	2.19-	2.25	377	533	9.21	13.02
5.35-	5.54	2.11-	2.18	113	156	2.76	3.81
5.15-	5.34	2.03-	2.10	36	43	0.88	1.05
4.95-	5.14	1.95-	2.02	7	7	0.17	0.17

Table F-36

Menthon Nasal Root

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
14.45-	14.64	5.69-	5.76	1	4095	0.02	100.00
14.25-	14.44	5.61-	5.68	0	4094	0.00	99.98
14.05-	14.24	5.53-	5.60	3	4094	0.07	99.98
13.85-	14.04	5.45-	5.52	1	4091	0.02	99.90
13.65-	13.84	5.37-	5.44	16	4090	0.39	99.88
13.45-	13.64	5.30-	5.36	12	4074	0.29	99.49
13.25-	13.44	5.22-	5.29	31	4062	0.76	99.19
13.05-	13.24	5.14-	5.21	107	4031	2.61	98.44
12.85-	13.04	5.06-	5.13	97	3924	2.37	95.82
12.65-	12.84	4.98-	5.05	270	3827	6.59	93.46
12.45-	12.64	4.90-	4.97	234	3557	5.71	86.86
12.25-	12.44	4.82-	4.89	458	3323	11.18	81.15
12.05-	12.24	4.74-	4.81	522	2865	12.75	69.96
11.85-	12.04	4.67-	4.73	524	2343	12.80	57.22
11.65-	11.84	4.59-	4.66	619	1819	15.12	44.42
11.45-	11.64	4.51-	4.58	324	1200	7.91	29.30
11.25-	11.44	4.43-	4.50	427	876	10.43	21.39
11.05-	11.24	4.35-	4.42	177	449	4.32	10.96
10.85-	11.04	4.27-	4.34	139	272	3.39	6.64
10.65-	10.84	4.19-	4.26	85	133	2.08	3.25
10.45-	10.64	4.11-	4.18	18	48	0.44	1.17
10.25-	10.44	4.04-	4.10	26	30	0.63	0.73
10.05-	10.24	3.96-	4.03	4	4	0.10	0.10

Table F-37

Hand Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
21.85-	22.14	8.60-	8.71	1	4095	0.02	100.00
21.55-	21.84	8.48-	8.59	11	4094	0.27	99.98
21.25-	21.54	8.37-	8.47	25	4083	0.61	99.71
20.95-	21.24	8.25-	8.36	26	4058	0.63	99.10
20.65-	20.94	8.13-	8.24	62	4032	1.51	98.46
20.35-	20.64	8.01-	8.12	131	3970	3.20	96.95
20.05-	20.34	7.89-	8.00	181	3839	4.42	93.75
19.75-	20.04	7.78-	7.88	223	3658	5.45	89.33
19.45-	19.74	7.66-	7.77	356	3435	8.69	83.88
19.15-	19.44	7.54-	7.65	593	3079	14.48	75.19
18.85-	19.14	7.42-	7.53	501	2486	12.23	60.71
18.55-	18.84	7.30-	7.41	533	1985	13.02	48.47
18.25-	18.54	7.19-	7.29	532	1452	12.99	35.46
17.95-	18.24	7.07-	7.18	310	920	7.57	22.47
17.65-	17.94	6.95-	7.06	277	610	6.76	14.90
17.35-	17.64	6.83-	6.94	186	333	4.54	8.13
17.05-	17.34	6.71-	6.82	75	147	1.83	3.59
16.75-	17.04	6.59-	6.70	43	72	1.05	1.76
16.45-	16.74	6.48-	6.58	15	29	0.37	0.71
16.15-	16.44	6.36-	6.47	11	14	0.27	0.34
15.85-	16.14	6.24-	6.35	1	3	0.02	0.07
15.55-	15.84	6.12-	6.23	1	2	0.02	0.05
15.25-	15.54	6.00-	6.11	1	1	0.02	0.02

Table F-38

Palm Length

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
12.35-	12.64	4.86-	4.97	4	4095	0.10	100.00
12.05-	12.34	4.74-	4.85	11	4091	0.27	99.90
11.75-	12.04	4.63-	4.73	25	4080	0.61	99.63
11.45-	11.74	4.51-	4.62	80	4055	1.95	99.02
11.15-	11.44	4.39-	4.50	265	3975	6.47	97.07
10.85-	11.14	4.27-	4.38	382	3710	9.33	90.60
10.55-	10.84	4.15-	4.26	718	3328	17.53	81.27
10.25-	10.54	4.04-	4.14	885	2610	21.61	63.74
9.95-	10.24	3.92-	4.03	738	1725	18.02	42.12
9.65-	9.94	3.80-	3.91	549	987	13.41	24.10
9.35-	9.64	3.68-	3.79	256	438	6.25	10.70
9.05-	9.34	3.56-	3.67	136	182	3.32	4.44
8.75-	9.04	3.44-	3.55	33	46	0.81	1.12
8.45-	8.74	3.33-	3.43	10	13	0.24	0.32
8.15-	8.44	3.21-	3.32	2	3	0.05	0.07
7.85-	8.14	3.09-	3.20	0	1	0.00	0.02
7.55-	7.84	2.97-	3.08	0	1	0.00	0.02
7.25-	7.54	2.85-	2.96	1	1	0.02	0.02

Table F-39

Thumb Crotch Length

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
6.65-	6.84	2.62-	2.69	2	4095	0.05	100.00
6.45-	6.64	2.54-	2.61	4	4093	0.10	99.95
6.25-	6.44	2.46-	2.53	13	4089	0.32	99.85
6.05-	6.24	2.38-	2.45	50	4076	1.22	99.54
5.85-	6.04	2.30-	2.37	70	4026	1.71	98.32
5.65-	5.84	2.22-	2.29	197	3956	4.81	96.61
5.45-	5.64	2.15-	2.21	261	3759	6.37	91.79
5.25-	5.44	2.07-	2.14	521	3498	12.72	85.42
5.05-	5.24	1.99-	2.06	660	2977	16.12	72.70
4.85-	5.04	1.91-	1.98	516	2317	12.60	56.58
4.65-	4.84	1.83-	1.90	780	1801	19.05	43.98
4.45-	4.64	1.75-	1.82	364	1021	8.89	24.93
4.25-	4.44	1.67-	1.74	359	657	8.77	16.04
4.05-	4.24	1.59-	1.66	175	298	4.27	7.28
3.85-	4.04	1.52-	1.58	69	123	1.68	3.00
3.65-	3.84	1.44-	1.51	39	54	0.95	1.32
3.45-	3.64	1.36-	1.43	8	15	0.20	0.37
3.25-	3.44	1.28-	1.35	4	7	0.10	0.17
3.05-	3.24	1.20-	1.27	2	3	0.05	0.07
2.85-	3.04	1.12-	1.19	0	1	0.00	0.02
2.65-	2.84	1.04-	1.11	0	1	0.00	0.02
2.45-	2.64	0.96-	1.03	1	1	0.02	0.02

Table F-40

Hand Breadth

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
10.85-	11.04	4.27-	4.34	2	4095	0.05	100.00
10.65-	10.84	4.19-	4.26	8	4093	0.20	99.95
10.45-	10.64	4.11-	4.18	8	4085	0.20	99.76
10.25-	10.44	4.04-	4.10	46	4077	1.12	99.56
10.05-	10.24	3.96-	4.03	88	4031	2.15	98.44
9.85-	10.04	3.88-	3.95	141	3943	3.44	96.29
9.65-	9.84	3.80-	3.87	251	3802	6.13	92.84
9.45-	9.64	3.72-	3.79	285	3551	6.96	86.72
9.25-	9.44	3.64-	3.71	416	3266	10.16	79.76
9.05-	9.24	3.56-	3.63	505	2850	12.33	69.60
8.85-	9.04	3.48-	3.55	478	2345	11.67	57.26
8.65-	8.84	3.41-	3.47	623	1867	15.21	45.59
8.45-	8.64	3.33-	3.40	387	1244	9.45	30.38
8.25-	8.44	3.25-	3.32	430	857	10.50	20.93
8.05-	8.24	3.17-	3.24	247	427	6.03	10.43
7.85-	8.04	3.09-	3.16	109	180	2.66	4.40
7.65-	7.84	3.01-	3.08	48	71	1.17	1.73
7.45-	7.64	2.93-	3.00	16	23	0.39	0.56
7.25-	7.44	2.85-	2.92	5	7	0.12	0.17
7.05-	7.24	2.78-	2.84	2	2	0.05	0.05

Table F-41

Heel Breadth

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
8.55-	8.74	3.37-	3.43	2	4095	0.05	100.00
8.35-	8.54	3.29-	3.36	0	4093	0.00	99.95
8.15-	8.34	3.21-	3.28	9	4093	0.22	99.95
7.95-	8.14	3.13-	3.20	6	4084	0.15	99.73
7.75-	7.94	3.05-	3.12	34	4078	0.83	99.58
7.55-	7.74	2.97-	3.04	69	4044	1.68	98.75
7.35-	7.54	2.89-	2.96	210	3975	5.13	97.07
7.15-	7.34	2.81-	2.88	282	3765	6.89	91.94
6.95-	7.14	2.74-	2.80	493	3483	12.04	85.05
6.75-	6.94	2.66-	2.73	779	2990	19.02	73.02
6.55-	6.74	2.58-	2.65	718	2211	17.53	53.99
6.35-	6.54	2.50-	2.57	715	1493	17.46	36.46
6.15-	6.34	2.42-	2.49	475	778	11.60	19.00
5.95-	6.14	2.34-	2.41	165	303	4.03	7.40
5.75-	5.94	2.26-	2.33	90	138	2.20	3.37
5.55-	5.74	2.19-	2.25	40	48	0.98	1.17
5.35-	5.54	2.11-	2.18	4	8	0.10	0.20
5.15-	5.34	2.03-	2.10	3	4	0.07	0.10
4.95-	5.14	1.95-	2.02	1	1	0.02	0.02

Table F-42

Foot Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
31.25-	31.64	12.30-	12.45	1	4095	0.02	100.00
30.85-	31.24	12.15-	12.29	1	4094	0.02	99.98
30.45-	30.84	11.99-	12.14	3	4093	0.07	99.95
30.05-	30.44	11.83-	11.98	11	4090	0.27	99.88
29.65-	30.04	11.67-	11.82	32	4079	0.78	99.61
29.25-	29.64	11.52-	11.66	34	4047	0.83	98.83
28.85-	29.24	11.36-	11.51	75	4013	1.83	98.00
28.45-	28.84	11.20-	11.35	115	3938	2.81	96.17
28.05-	28.44	11.04-	11.19	213	3823	5.20	93.36
27.65-	28.04	10.89-	11.03	275	3610	6.72	88.16
27.25-	27.64	10.73-	10.88	409	3335	9.99	81.44
26.85-	27.24	10.57-	10.72	388	2926	9.47	71.45
26.45-	26.84	10.41-	10.56	513	2538	12.53	61.98
26.05-	26.44	10.26-	10.40	535	2025	13.06	49.45
25.65-	26.04	10.10-	10.25	448	1490	10.94	36.39
25.25-	25.64	9.94-	10.09	345	1042	8.42	25.45
24.85-	25.24	9.78-	9.93	273	697	6.67	17.02
24.45-	24.84	9.63-	9.77	225	424	5.49	10.35
24.05-	24.44	9.47-	9.62	102	199	2.49	4.86
23.65-	24.04	9.31-	9.46	59	97	1.44	2.37
23.25-	23.64	9.15-	9.30	26	38	0.63	0.93
22.85-	23.24	9.00-	9.14	8	12	0.20	0.29
22.45-	22.84	8.84-	8.99	1	4	0.02	0.10
22.05-	22.44	8.68-	8.83	3	3	0.07	0.07

Table F-43

Ball of Foot Length

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
22.85-	23.24	9.00-	9.14	2	4095	0.05	100.00
22.45-	22.84	8.84-	8.99	3	4093	0.07	99.95
22.05-	22.44	8.68-	8.83	26	4090	0.63	99.88
21.65-	22.04	8.52-	8.67	49	4064	1.20	99.24
21.25-	21.64	8.37-	8.51	86	4015	2.10	98.05
20.85-	21.24	8.21-	8.36	131	3929	3.20	95.95
20.45-	20.84	8.05-	8.20	302	3798	7.37	92.75
20.05-	20.44	7.89-	8.04	483	3496	11.79	85.37
19.65-	20.04	7.74-	7.88	519	3013	12.67	73.58
19.25-	19.64	7.58-	7.73	624	2494	15.24	60.90
18.85-	19.24	7.42-	7.57	537	1870	13.11	45.67
18.45-	18.84	7.26-	7.41	499	1333	12.19	32.55
18.05-	18.44	7.11-	7.25	432	834	10.55	20.37
17.65-	18.04	6.95-	7.10	222	402	5.42	9.82
17.25-	17.64	6.79-	6.94	99	180	2.42	4.40
16.85-	17.24	6.63-	6.78	50	81	1.22	1.98
16.45-	16.84	6.48-	6.62	24	31	0.59	0.76
16.05-	16.44	6.32-	6.47	6	7	0.15	0.17
15.65-	16.04	6.16-	6.31	0	1	0.00	0.02
15.25-	15.64	6.00-	6.15	1	1	0.02	0.02

Table F-44

Ball of Foot Breadth

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
11.95-	12.14	4.70-	4.77	2	4095	0.05	100.00
11.75-	11.94	4.63-	4.69	0	4093	0.00	99.95
11.55-	11.74	4.55-	4.62	6	4093	0.15	99.95
11.35-	11.54	4.47-	4.54	12	4087	0.29	99.80
11.15-	11.34	4.39-	4.46	17	4075	0.42	99.51
10.95-	11.14	4.31-	4.38	27	4058	0.66	99.10
10.75-	10.94	4.23-	4.30	75	4031	1.83	98.44
10.55-	10.74	4.15-	4.22	156	3956	3.81	96.61
10.35-	10.54	4.07-	4.14	215	3800	5.25	92.80
10.15-	10.34	4.00-	4.06	451	3585	11.01	87.55
9.95-	10.14	3.92-	3.99	455	3134	11.11	76.53
9.75-	9.94	3.84-	3.91	490	2679	11.97	65.42
9.55-	9.74	3.76-	3.83	731	2189	17.85	53.46
9.35-	9.54	3.68-	3.75	471	1458	11.50	35.60
9.15-	9.34	3.60-	3.67	546	987	13.33	24.10
8.95-	9.14	3.52-	3.59	240	441	5.86	10.77
8.75-	8.94	3.44-	3.51	112	201	2.74	4.91
8.55-	8.74	3.37-	3.43	68	89	1.66	2.17
8.35-	8.54	3.29-	3.36	13	21	0.32	0.51
8.15-	8.34	3.21-	3.28	8	8	0.20	0.20

Table F-45

Head Circumference

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
61.95-	62.44	24.39-	24.58	2	4095	0.05	100.00
61.45-	61.94	24.19-	24.38	0	4093	0.00	99.95
60.95-	61.44	24.00-	24.18	3	4093	0.07	99.95
60.45-	60.94	23.80-	23.99	5	4090	0.12	99.88
59.95-	60.44	23.60-	23.79	23	4085	0.56	99.76
59.45-	59.94	23.41-	23.59	14	4062	0.34	99.19
58.95-	59.44	23.21-	23.40	71	4048	1.73	98.85
58.45-	58.94	23.01-	23.20	103	3977	2.52	97.12
57.95-	58.44	22.81-	23.00	174	3874	4.25	94.60
57.45-	57.94	22.62-	22.80	261	3700	6.37	90.35
56.95-	57.44	22.42-	22.61	431	3439	10.53	83.98
56.45-	56.94	22.22-	22.41	386	3008	9.43	73.46
55.95-	56.44	22.03-	22.21	532	2622	12.99	64.03
55.45-	55.94	21.83-	22.02	495	2090	12.09	51.04
54.95-	55.44	21.63-	21.82	533	1595	13.02	38.95
54.45-	54.94	21.44-	21.62	337	1062	8.23	25.93
53.95-	54.44	21.24-	21.43	328	725	8.01	17.70
53.45-	53.94	21.04-	21.23	180	397	4.40	9.69
52.95-	53.44	20.85-	21.03	114	217	2.78	5.30
52.45-	52.94	20.65-	20.84	49	103	1.20	2.52
51.95-	52.44	20.45-	20.64	31	54	0.76	1.32
51.45-	51.94	20.26-	20.44	16	23	0.39	0.56
50.95-	51.44	20.06-	20.25	7	7	0.17	0.17

Table F-46

Neck Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
43.35-	43.94	17.07-	17.29	4	4095	0.10	100.00
42.75-	43.34	16.83-	17.06	12	4091	0.29	99.90
42.15-	42.74	16.59-	16.82	9	4079	0.22	99.61
41.55-	42.14	16.36-	16.58	17	4070	0.42	99.39
40.95-	41.54	16.12-	16.35	35	4053	0.85	98.97
40.35-	40.94	15.89-	16.11	58	4018	1.42	98.12
39.75-	40.34	15.65-	15.88	118	3960	2.88	96.70
39.15-	39.74	15.41-	15.64	152	3842	3.71	93.82
38.55-	39.14	15.18-	15.40	230	3690	5.62	90.11
37.95-	38.54	14.94-	15.17	320	3460	7.81	84.49
37.35-	37.94	14.70-	14.93	366	3140	8.94	76.68
36.75-	37.34	14.47-	14.69	519	2774	12.67	67.74
36.15-	36.74	14.23-	14.46	459	2255	11.21	55.07
35.55-	36.14	14.00-	14.22	495	1796	12.09	43.86
34.95-	35.54	13.76-	13.99	377	1301	9.21	31.77
34.35-	34.94	13.52-	13.75	337	924	8.23	22.56
33.75-	34.34	13.29-	13.51	302	587	7.37	14.33
33.15-	33.74	13.05-	13.28	139	285	3.39	6.96
32.55-	33.14	12.81-	13.04	85	146	2.08	3.57
31.95-	32.54	12.58-	12.80	29	61	0.71	1.49
31.35-	31.94	12.34-	12.57	19	32	0.46	0.78
30.75-	31.34	12.11-	12.33	9	13	0.22	0.32
30.15-	30.74	11.87-	12.10	3	4	0.07	0.10
29.55-	30.14	11.63-	11.86	1	1	0.02	0.02

Table F-47

Shoulder Circumference

--INTERVALS--		--FREQUENCIES--			
CENTIMETERS	INCHES	ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
134.25- 136.24	52.85- 53.63	2	4095	0.05	100.00
132.25- 134.24	52.07- 52.84	4	4093	0.10	99.95
130.25- 132.24	51.28- 52.06	11	4089	0.27	99.85
128.25- 130.24	50.49- 51.27	35	4078	0.85	99.58
126.25- 128.24	49.70- 50.48	38	4043	0.93	98.73
124.25- 126.24	48.92- 49.69	67	4005	1.64	97.80
122.25- 124.24	48.13- 48.91	122	3938	2.98	96.17
120.25- 122.24	47.34- 48.12	198	3816	4.84	93.19
118.25- 120.24	46.56- 47.33	247	3618	6.03	88.35
116.25- 118.24	45.77- 46.55	318	3371	7.77	82.32
114.25- 116.24	44.98- 45.76	423	3053	10.33	74.55
112.25- 114.24	44.19- 44.97	515	2630	12.58	64.22
110.25- 112.24	43.41- 44.18	531	2115	12.97	51.65
108.25- 110.24	42.62- 43.40	473	1584	11.55	38.68
106.25- 108.24	41.83- 42.61	422	1111	10.31	27.13
104.25- 106.24	41.04- 41.82	315	689	7.69	16.83
102.25- 104.24	40.26- 41.03	191	374	4.66	9.13
100.25- 102.24	39.47- 40.25	98	183	2.39	4.47
98.25- 100.24	38.68- 39.46	47	85	1.15	2.08
96.25- 98.24	37.89- 38.67	27	38	0.66	0.93
94.25- 96.24	37.11- 37.88	9	11	0.22	0.27
92.25- 94.24	36.32- 37.10	1	2	0.02	0.05
90.25- 92.24	35.53- 36.31	1	1	0.02	0.02

Table F-48

Chest Circumference

--INTERVALS--		--FREQUENCIES--			
CENTIMETERS	INCHES	ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
118.25- 120.24	46.56- 47.33	1	4095	0.02	100.00
116.25- 118.24	45.77- 46.55	2	4094	0.05	99.98
114.25- 116.24	44.98- 45.76	9	4092	0.22	99.93
112.25- 114.24	44.19- 44.97	14	4083	0.34	99.71
110.25- 112.24	43.41- 44.18	31	4069	0.76	99.37
108.25- 110.24	42.62- 43.40	34	4038	0.83	98.61
106.25- 108.24	41.83- 42.61	65	4004	1.59	97.78
104.25- 106.24	41.04- 41.82	91	3939	2.22	96.19
102.25- 104.24	40.26- 41.03	161	3848	3.93	93.97
100.25- 102.24	39.47- 40.25	178	3687	4.35	90.04
98.25- 100.24	38.68- 39.46	243	3509	5.93	85.69
96.25- 98.24	37.89- 38.67	359	3266	8.77	79.76
94.25- 96.24	37.11- 37.88	397	2907	9.69	70.99
92.25- 94.24	36.32- 37.10	499	2510	12.19	61.29
90.25- 92.24	35.53- 36.31	535	2011	13.06	49.11
88.25- 90.24	34.74- 35.52	466	1476	11.38	36.04
86.25- 88.24	33.96- 34.73	420	1010	10.26	24.66
84.25- 86.24	33.17- 33.95	276	590	6.74	14.41
82.25- 84.24	32.38- 33.16	177	314	4.32	7.67
80.25- 82.24	31.59- 32.37	93	137	2.27	3.35
78.25- 80.24	30.81- 31.58	34	44	0.83	1.07
76.25- 78.24	30.02- 30.80	7	10	0.17	0.24
74.25- 76.24	29.23- 30.01	3	3	0.07	0.07

Table F-49

Waist Circumference

--INTERVALS--				--FREQUENCIES--		
CENTIMETERS		INCHES	ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
110.75-	113.24	43.60- 44.58	4	4095	0.10	100.00
108.25-	110.74	42.62- 43.59	4	4091	0.10	99.90
105.75-	108.24	41.63- 42.61	7	4087	0.17	99.80
103.25-	105.74	40.65- 41.62	22	4080	0.54	99.63
100.75-	103.24	39.67- 40.64	40	4058	0.98	99.10
98.25-	100.74	38.68- 39.66	62	4018	1.51	98.12
95.75-	98.24	37.70- 38.67	91	3956	2.22	96.61
93.25-	95.74	36.71- 37.69	112	3865	2.74	94.38
90.75-	93.24	35.73- 36.70	138	3753	3.37	91.65
88.25-	90.74	34.74- 35.72	184	3615	4.49	88.28
85.75-	88.24	33.76- 34.73	238	3431	5.81	83.79
83.25-	85.74	32.78- 33.75	326	3193	7.96	77.97
80.75-	83.24	31.79- 32.77	410	2867	10.01	70.01
78.25-	80.74	30.81- 31.78	520	2457	12.70	60.00
75.75-	78.24	29.82- 30.80	597	1937	14.58	47.30
73.25-	75.74	28.84- 29.81	558	1340	13.63	32.72
70.75-	73.24	27.85- 28.83	446	782	10.89	19.10
68.25-	70.74	26.87- 27.84	210	336	5.13	8.21
65.75-	68.24	25.89- 26.86	94	126	2.30	3.08
63.25-	65.74	24.90- 25.88	28	32	0.68	0.78
60.75-	63.24	23.92- 24.89	4	4	0.10	0.10

Table F-50

Hip Circumference

--INTERVALS--			--FREQUENCIES--			
CENTIMETERS		INCHES	ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
123.25-	125.24	48.52- 49.30	1	4095	0.02	100.00
121.25-	123.24	47.74- 48.51	0	4094	0.00	99.98
119.25-	121.24	46.95- 47.73	0	4094	0.00	99.98
117.25-	119.24	46.16- 46.94	1	4094	0.02	99.98
115.25-	117.24	45.37- 46.15	4	4093	0.10	99.95
113.25-	115.24	44.59- 45.36	7	4089	0.17	99.85
111.25-	113.24	43.80- 44.58	15	4082	0.37	99.68
109.25-	111.24	43.01- 43.79	39	4067	0.95	99.32
107.25-	109.24	42.22- 43.00	61	4028	1.49	98.36
105.25-	107.24	41.44- 42.21	98	3967	2.39	96.87
103.25-	105.24	40.65- 41.43	128	3869	3.13	94.48
101.25-	103.24	39.86- 40.64	173	3741	4.22	91.36
99.25-	101.24	39.07- 39.85	242	3568	5.91	87.13
97.25-	99.24	38.29- 39.06	303	3326	7.40	81.22
95.25-	97.24	37.50- 38.28	363	3023	8.86	73.82
93.25-	95.24	36.71- 37.49	439	2660	10.72	64.96
91.25-	93.24	35.93- 36.70	589	2221	14.38	54.24
89.25-	91.24	35.14- 35.92	560	1632	13.68	39.85
87.25-	89.24	34.35- 35.13	471	1072	11.50	26.18
85.25-	87.24	33.56- 34.34	324	601	7.91	14.68
83.25-	85.24	32.78- 33.55	163	277	3.98	6.76
81.25-	83.24	31.99- 32.77	83	114	2.03	2.78
79.25-	81.24	31.20- 31.98	21	31	0.51	0.76
77.25-	79.24	30.41- 31.19	10	10	0.24	0.24

Table F-51

Arm Scye Circumference

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
56.75-	58.24	22.34-	22.92	3	4095	0.07	100.00
55.25-	56.74	21.75-	22.33	1	4092	0.02	99.93
53.75-	55.24	21.16-	21.74	4	4091	0.10	99.90
52.25-	53.74	20.57-	21.15	11	4087	0.27	99.80
50.75-	52.24	19.98-	20.56	42	4076	1.03	99.54
49.25-	50.74	19.39-	19.97	109	4034	2.66	98.51
47.75-	49.24	18.80-	19.38	225	3925	5.49	95.85
46.25-	47.74	18.21-	18.79	294	3700	7.18	90.35
44.75-	46.24	17.62-	18.20	561	3406	13.70	83.17
43.25-	44.74	17.03-	17.61	653	2845	15.95	69.47
41.75-	43.24	16.44-	17.02	846	2192	20.66	53.53
40.25-	41.74	15.85-	16.43	658	1346	16.07	32.87
38.75-	40.24	15.26-	15.84	434	688	10.60	16.80
37.25-	38.74	14.67-	15.25	173	254	4.22	6.20
35.75-	37.24	14.07-	14.66	57	81	1.39	1.98
34.25-	35.74	13.48-	14.06	15	24	0.37	0.59
32.75-	34.24	12.89-	13.47	8	9	0.20	0.22
31.25-	32.74	12.30-	12.88	0	1	0.00	0.02
29.75-	31.24	11.71-	12.29	0	1	0.00	0.02
28.25-	29.74	11.12-	11.70	0	1	0.00	0.02
26.75-	28.24	10.53-	11.11	1	1	0.02	0.02

Table F-52

Bicepts Circumference

--INTERVALS-- CENTIMETERS		--INTERVALS-- INCHES		--FREQUENCIES-- ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
38.35-	39.14	15.10-	15.40	4	4095	0.10	100.00
37.55-	38.34	14.78-	15.09	11	4091	0.27	99.90
36.75-	37.54	14.47-	14.77	17	4080	0.42	99.63
35.95-	36.74	14.15-	14.46	24	4063	0.59	99.22
35.15-	35.94	13.84-	14.14	39	4039	0.95	98.63
34.35-	35.14	13.52-	13.83	63	4000	1.54	97.68
33.55-	34.34	13.21-	13.51	113	3937	2.76	96.14
32.75-	33.54	12.89-	13.20	158	3824	3.86	93.38
31.95-	32.74	12.58-	12.88	211	3666	5.15	89.52
31.15-	31.94	12.26-	12.57	249	3455	6.08	84.37
30.35-	31.14	11.95-	12.25	310	3206	7.57	78.29
29.55-	30.34	11.63-	11.94	356	2896	8.69	70.72
28.75-	29.54	11.32-	11.62	472	2540	11.53	62.03
27.95-	28.74	11.00-	11.31	447	2068	10.92	50.50
27.15-	27.94	10.69-	10.99	422	1621	10.31	39.58
26.35-	27.14	10.37-	10.68	411	1199	10.04	29.28
25.55-	26.34	10.06-	10.36	347	788	8.47	19.24
24.75-	25.54	9.74-	10.05	218	441	5.32	10.77
23.95-	24.74	9.43-	9.73	117	223	2.86	5.45
23.15-	23.94	9.11-	9.42	61	106	1.49	2.59
22.35-	23.14	8.80-	9.10	29	45	0.71	1.10
21.55-	22.34	8.48-	8.79	11	16	0.27	0.39
20.75-	21.54	8.17-	8.47	5	5	0.12	0.12

Table F-53

Wrist Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
19.85-	20.14	7.81-	7.92	2	4095	0.05	100.00
19.55-	19.84	7.70-	7.80	6	4093	0.15	99.95
19.25-	19.54	7.58-	7.69	21	4087	0.51	99.80
18.95-	19.24	7.46-	7.57	44	4066	1.07	99.29
18.65-	18.94	7.34-	7.45	56	4022	1.37	98.22
18.35-	18.64	7.22-	7.33	105	3966	2.56	96.85
18.05-	18.34	7.11-	7.21	182	3861	4.44	94.29
17.75-	18.04	6.99-	7.10	343	3679	8.38	89.84
17.45-	17.74	6.87-	6.98	351	3336	8.57	81.47
17.15-	17.44	6.75-	6.86	566	2985	13.82	72.89
16.85-	17.14	6.63-	6.74	503	2419	12.28	59.07
16.55-	16.84	6.52-	6.62	509	1916	12.43	46.79
16.25-	16.54	6.40-	6.51	562	1407	13.72	34.36
15.95-	16.24	6.28-	6.39	361	845	8.82	20.63
15.65-	15.94	6.16-	6.27	255	484	6.23	11.82
15.35-	15.64	6.04-	6.15	110	229	2.69	5.59
15.05-	15.34	5.93-	6.03	80	119	1.95	2.91
14.75-	15.04	5.81-	5.92	24	39	0.59	0.95
14.45-	14.74	5.69-	5.80	7	15	0.17	0.37
14.15-	14.44	5.57-	5.68	6	8	0.15	0.20
13.85-	14.14	5.45-	5.56	2	2	0.05	0.05

Table F-54

Hand Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
25.15-	25.54	9.90-	10.05	3	4095	0.07	100.00
24.75-	25.14	9.74-	9.89	6	4092	0.15	99.93
24.35-	24.74	9.59-	9.73	13	4086	0.32	99.78
23.95-	24.34	9.43-	9.58	38	4073	0.93	99.46
23.55-	23.94	9.27-	9.42	59	4035	1.44	98.53
23.15-	23.54	9.11-	9.26	106	3976	2.59	97.09
22.75-	23.14	8.96-	9.10	247	3870	6.03	94.51
22.35-	22.74	8.80-	8.95	278	3623	6.79	88.47
21.95-	22.34	8.64-	8.79	522	3345	12.75	81.68
21.55-	21.94	8.48-	8.63	544	2823	13.28	68.94
21.15-	21.54	8.33-	8.47	600	2279	14.65	55.65
20.75-	21.14	8.17-	8.32	585	1679	14.29	41.00
20.35-	20.74	8.01-	8.16	401	1094	9.79	26.72
19.95-	20.34	7.85-	8.00	383	693	9.35	16.92
19.55-	19.94	7.70-	7.84	159	310	3.88	7.57
19.15-	19.54	7.54-	7.69	104	151	2.54	3.69
18.75-	19.14	7.38-	7.53	30	47	0.73	1.15
18.35-	18.74	7.22-	7.37	11	17	0.27	0.42
17.95-	18.34	7.07-	7.21	6	6	0.15	0.15

Table F-55

Biceps Circumference Flexed

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
41.25-	42.24	16.24-	16.62	2	4095	0.05	100.00
40.25-	41.24	15.85-	16.23	1	4093	0.02	99.95
39.25-	40.24	15.45-	15.84	16	4092	0.39	99.93
38.25-	39.24	15.06-	15.44	30	4076	0.73	99.54
37.25-	38.24	14.67-	15.05	62	4046	1.51	98.80
36.25-	37.24	14.27-	14.66	134	3984	3.27	97.29
35.25-	36.24	13.88-	14.26	210	3850	5.13	94.02
34.25-	35.24	13.48-	13.87	309	3640	7.55	88.89
33.25-	34.24	13.09-	13.47	389	3331	9.50	81.34
32.25-	33.24	12.70-	13.08	520	2942	12.70	71.84
31.25-	32.24	12.30-	12.69	587	2422	14.33	59.15
30.25-	31.24	11.91-	12.29	578	1835	14.11	44.81
29.25-	30.24	11.52-	11.90	525	1257	12.82	30.70
28.25-	29.24	11.12-	11.51	388	732	9.47	17.88
27.25-	28.24	10.73-	11.11	198	344	4.84	8.40
26.25-	27.24	10.33-	10.72	93	146	2.27	3.57
25.25-	26.24	9.94-	10.32	39	53	0.95	1.29
24.25-	25.24	9.55-	9.93	11	14	0.27	0.34
23.25-	24.24	9.15-	9.54	2	3	0.05	0.07
22.25-	23.24	8.76-	9.14	0	1	0.00	0.02
21.25-	22.24	8.37-	8.75	1	1	0.02	0.02

Table F-56

Forearm Circumference Flexed

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
35.65-	36.24	14.04-	14.26	3	4095	0.07	100.00
35.05-	35.64	13.80-	14.03	3	4092	0.07	99.93
34.45-	35.04	13.56-	13.79	2	4089	0.05	99.85
33.85-	34.44	13.33-	13.55	15	4087	0.37	99.80
33.25-	33.84	13.09-	13.32	27	4072	0.66	99.44
32.65-	33.24	12.85-	13.08	47	4045	1.15	98.78
32.05-	32.64	12.62-	12.84	79	3998	1.93	97.63
31.45-	32.04	12.38-	12.61	135	3919	3.30	95.70
30.85-	31.44	12.15-	12.37	200	3784	4.88	92.41
30.25-	30.84	11.91-	12.14	268	3584	6.54	87.52
29.65-	30.24	11.67-	11.90	382	3316	9.33	80.98
29.05-	29.64	11.44-	11.66	476	2934	11.62	71.65
28.45-	29.04	11.20-	11.43	430	2458	10.50	60.02
27.85-	28.44	10.96-	11.19	497	2028	12.14	49.52
27.25-	27.84	10.73-	10.95	436	1531	10.65	37.39
26.65-	27.24	10.49-	10.72	435	1095	10.62	26.74
26.05-	26.64	10.26-	10.48	285	660	6.96	16.12
25.45-	26.04	10.02-	10.25	163	375	3.98	9.16
24.85-	25.44	9.78-	10.01	111	212	2.71	5.18
24.25-	24.84	9.55-	9.77	61	101	1.49	2.47
23.65-	24.24	9.31-	9.54	22	40	0.54	0.98
23.05-	23.64	9.07-	9.30	13	18	0.32	0.44
22.45-	23.04	8.84-	9.06	2	5	0.05	0.12
21.85-	22.44	8.60-	8.83	1	3	0.02	0.07
21.25-	21.84	8.37-	8.59	2	2	0.05	0.05

Table F-57

Waist Back Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
56.25-	57.74	22.15-	22.73	2	4095	0.05	100.00
54.75-	56.24	21.56-	22.14	2	4093	0.05	99.95
53.25-	54.74	20.96-	21.55	14	4091	0.34	99.90
51.75-	53.24	20.37-	20.95	49	4077	1.20	99.56
50.25-	51.74	19.78-	20.36	87	4028	2.12	98.36
48.75-	50.24	19.19-	19.77	224	3941	5.47	96.24
47.25-	48.74	18.60-	19.18	310	3717	7.57	90.77
45.75-	47.24	18.01-	18.59	594	3407	14.51	83.20
44.25-	45.74	17.42-	18.00	500	2813	12.21	68.69
42.75-	44.24	16.83-	17.41	600	2313	14.65	56.48
41.25-	42.74	16.24-	16.82	602	1713	14.70	41.83
39.75-	41.24	15.65-	16.23	572	1111	13.97	27.13
38.25-	39.74	15.06-	15.64	314	539	7.67	13.16
36.75-	38.24	14.47-	15.05	153	225	3.74	5.49
35.25-	36.74	13.88-	14.46	61	72	1.49	1.76
33.75-	35.24	13.29-	13.87	3	11	0.07	0.27
32.25-	33.74	12.70-	13.28	2	8	0.05	0.20
30.75-	32.24	12.11-	12.69	6	6	0.15	0.15

Table F-58

Shoulder Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
21.45-	21.94	8.44-	8.63	6	4095	0.15	100.00
20.95-	21.44	8.25-	8.43	10	4089	0.24	99.85
20.45-	20.94	8.05-	8.24	9	4079	0.22	99.61
19.95-	20.44	7.85-	8.04	67	4070	1.64	99.39
19.45-	19.94	7.66-	7.84	149	4003	3.64	97.75
18.95-	19.44	7.46-	7.65	205	3854	5.01	94.11
18.45-	18.94	7.26-	7.45	205	3649	5.01	89.11
17.95-	18.44	7.07-	7.25	195	3444	4.76	84.10
17.45-	17.94	6.87-	7.06	247	3249	6.03	79.34
16.95-	17.44	6.67-	6.86	521	3002	12.72	73.31
16.45-	16.94	6.48-	6.66	400	2481	9.77	60.59
15.95-	16.44	6.28-	6.47	651	2081	15.90	50.82
15.45-	15.94	6.08-	6.27	436	1430	10.65	34.92
14.95-	15.44	5.89-	6.07	420	994	10.26	24.27
14.45-	14.94	5.69-	5.88	227	574	5.54	14.02
13.95-	14.44	5.49-	5.68	212	347	5.18	8.47
13.45-	13.94	5.30-	5.48	61	135	1.49	3.30
12.95-	13.44	5.10-	5.29	44	74	1.07	1.81
12.45-	12.94	4.90-	5.09	10	30	0.24	0.73
11.95-	12.44	4.70-	4.89	13	20	0.32	0.49
11.45-	11.94	4.51-	4.69	1	7	0.02	0.17
10.95-	11.44	4.31-	4.50	4	6	0.10	0.15
10.45-	10.94	4.11-	4.30	2	2	0.05	0.05

Table F-59

Interscye Distance

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
51.25-	52.24	20.18-	20.56	1	4095	0.02	100.00
50.25-	51.24	19.78-	20.17	0	4094	0.00	99.98
49.25-	50.24	19.39-	19.77	8	4094	0.20	99.98
48.25-	49.24	19.00-	19.38	17	4086	0.42	99.78
47.25-	48.24	18.60-	18.99	25	4069	0.61	99.37
46.25-	47.24	18.21-	18.59	31	4044	0.76	98.75
45.25-	46.24	17.81-	18.20	58	4013	1.42	98.00
44.25-	45.24	17.42-	17.80	105	3955	2.56	96.58
43.25-	44.24	17.03-	17.41	178	3850	4.35	94.02
42.25-	43.24	16.63-	17.02	278	3672	6.79	89.67
41.25-	42.24	16.24-	16.62	348	3394	8.50	82.88
40.25-	41.24	15.85-	16.23	407	3046	9.94	74.38
39.25-	40.24	15.45-	15.84	523	2639	12.77	64.44
38.25-	39.24	15.06-	15.44	522	2116	12.75	51.67
37.25-	38.24	14.67-	15.05	461	1594	11.26	38.93
36.25-	37.24	14.27-	14.66	406	1133	9.91	27.67
35.25-	36.24	13.88-	14.26	278	727	6.79	17.75
34.25-	35.24	13.48-	13.87	200	449	4.88	10.96
33.25-	34.24	13.09-	13.47	119	249	2.91	6.08
32.25-	33.24	12.70-	13.08	63	130	1.54	3.17
31.25-	32.24	12.30-	12.69	39	67	0.95	1.64
30.25-	31.24	11.91-	12.29	23	28	0.56	0.68
29.25-	30.24	11.52-	11.90	3	5	0.07	0.12
28.25-	29.24	11.12-	11.51	1	2	0.02	0.05
27.25-	28.24	10.73-	11.11	1	1	0.02	0.02

Table F-60

Interscye Maximum

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
67.25-	68.74	26.48-	27.06	1	4095	0.02	100.00
65.75-	67.24	25.89-	26.47	5	4094	0.12	99.98
64.25-	65.74	25.30-	25.88	8	4089	0.20	99.85
62.75-	64.24	24.70-	25.29	23	4081	0.56	99.66
61.25-	62.74	24.11-	24.69	63	4058	1.54	99.10
59.75-	61.24	23.52-	24.10	120	3995	2.93	97.56
58.25-	59.74	22.93-	23.51	222	3875	5.42	94.63
56.75-	58.24	22.34-	22.92	350	3653	8.55	89.21
55.25-	56.74	21.75-	22.33	462	3303	11.28	80.66
53.75-	55.24	21.16-	21.74	618	2841	15.09	69.38
52.25-	53.74	20.57-	21.15	594	2223	14.51	54.29
50.75-	52.24	19.98-	20.56	602	1629	14.70	39.78
49.25-	50.74	19.39-	19.97	508	1027	12.41	25.08
47.75-	49.24	18.80-	19.38	282	519	6.89	12.67
46.25-	47.74	18.21-	18.79	126	237	3.08	5.79
44.75-	46.24	17.62-	18.20	73	111	1.78	2.71
43.25-	44.74	17.03-	17.61	23	38	0.56	0.93
41.75-	43.24	16.44-	17.02	13	15	0.32	0.37
40.25-	41.74	15.85-	16.43	2	2	0.05	0.05

Table F-61

Sleeve Length

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
99.25-	100.74	39.07-	39.66	1	4095	0.02	100.00
97.75-	99.24	38.48-	39.06	9	4094	0.22	99.98
96.25-	97.74	37.89-	38.47	18	4085	0.44	99.76
94.75-	96.24	37.30-	37.88	39	4067	0.95	99.32
93.25-	94.74	36.71-	37.29	81	4028	1.98	98.36
91.75-	93.24	36.12-	36.70	160	3947	3.91	96.39
90.25-	91.74	35.53-	36.11	296	3787	7.23	92.48
88.75-	90.24	34.94-	35.52	427	3491	10.43	85.25
87.25-	88.74	34.35-	34.93	519	3064	12.67	74.82
85.75-	87.24	33.76-	34.34	658	2545	16.07	62.15
84.25-	85.74	33.17-	33.75	532	1887	12.99	46.08
82.75-	84.24	32.58-	33.16	523	1355	12.77	33.09
81.25-	82.74	31.99-	32.57	401	832	9.79	20.32
79.75-	81.24	31.40-	31.98	210	431	5.13	10.53
78.25-	79.74	30.81-	31.39	104	221	2.54	5.40
76.75-	78.24	30.22-	30.80	66	117	1.61	2.86
75.25-	76.74	29.63-	30.21	28	51	0.68	1.25
73.75-	75.24	29.04-	29.62	14	23	0.34	0.56
72.25-	73.74	28.44-	29.03	4	9	0.10	0.22
70.75-	72.24	27.85-	28.43	5	5	0.12	0.12

Table F-62

Sleeve Inseam

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
56.55-	57.24	22.26-	22.53	3	4095	0.07	100.00
55.85-	56.54	21.99-	22.25	7	4092	0.17	99.93
55.15-	55.84	21.71-	21.98	15	4085	0.37	99.76
54.45-	55.14	21.44-	21.70	29	4070	0.71	99.39
53.75-	54.44	21.16-	21.43	42	4041	1.03	98.68
53.05-	53.74	20.89-	21.15	85	3999	2.08	97.66
52.35-	53.04	20.61-	20.88	88	3914	2.15	95.58
51.65-	52.34	20.33-	20.60	186	3826	4.54	93.43
50.95-	51.64	20.06-	20.32	227	3640	5.54	88.89
50.25-	50.94	19.78-	20.05	309	3413	7.55	83.35
49.55-	50.24	19.51-	19.77	438	3104	10.70	75.80
48.85-	49.54	19.23-	19.50	425	2666	10.38	65.10
48.15-	48.84	18.96-	19.22	455	2241	11.11	54.73
47.45-	48.14	18.68-	18.95	330	1786	8.06	43.61
46.75-	47.44	18.41-	18.67	461	1456	11.26	35.56
46.05-	46.74	18.13-	18.40	370	995	9.04	24.30
45.35-	46.04	17.85-	18.12	190	625	4.64	15.26
44.65-	45.34	17.58-	17.84	179	435	4.37	10.62
43.95-	44.64	17.30-	17.57	109	256	2.66	6.25
43.25-	43.94	17.03-	17.29	59	147	1.44	3.59
42.55-	43.24	16.75-	17.02	45	88	1.10	2.15
41.85-	42.54	16.48-	16.74	22	43	0.54	1.05
41.15-	41.84	16.20-	16.47	12	21	0.29	0.51
40.45-	41.14	15.93-	16.19	4	9	0.10	0.22
39.75-	40.44	15.65-	15.92	5	5	0.12	0.12

Table F-63

Vertical Trunk Circumference

--INTERVALS--		--FREQUENCIES--			
CENTIMETERS	INCHES	ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
195.25- 197.74	76.87- 77.84	1	4095	0.02	100.00
192.75- 195.24	75.89- 76.86	3	4094	0.07	99.98
190.25- 192.74	74.90- 75.88	5	4091	0.12	99.90
187.75- 190.24	73.92- 74.89	9	4086	0.22	99.78
185.25- 187.74	72.93- 73.91	24	4077	0.59	99.56
182.75- 185.24	71.95- 72.92	32	4053	0.78	98.97
180.25- 182.74	70.96- 71.94	59	4021	1.44	98.19
177.75- 180.24	69.98- 70.95	89	3962	2.17	96.75
175.25- 177.74	69.00- 69.97	142	3873	3.47	94.58
172.75- 175.24	68.01- 68.99	211	3731	5.15	91.11
170.25- 172.74	67.03- 68.00	245	3520	5.98	85.96
167.75- 170.24	66.04- 67.02	357	3275	8.72	79.98
165.25- 167.74	65.06- 66.03	419	2918	10.23	71.26
162.75- 165.24	64.07- 65.05	403	2499	9.84	61.03
160.25- 162.74	63.09- 64.06	451	2096	11.01	51.18
157.75- 160.24	62.11- 63.08	438	1645	10.70	40.17
155.25- 157.74	61.12- 62.10	385	1207	9.40	29.47
152.75- 155.24	60.14- 61.11	300	822	7.33	20.07
150.25- 152.74	59.15- 60.13	213	522	5.20	12.75
147.75- 150.24	58.17- 59.14	141	309	3.44	7.55
145.25- 147.74	57.19- 58.16	82	168	2.00	4.10
142.75- 145.24	56.20- 57.18	44	86	1.07	2.10
140.25- 142.74	55.22- 56.19	24	42	0.59	1.03
137.75- 140.24	54.23- 55.21	11	18	0.27	0.44
135.25- 137.74	53.25- 54.22	7	7	0.17	0.17

Table F-64

Upper Thigh Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
73.25-	74.74	28.84-	29.42	1	4095	0.02	100.00
71.75-	73.24	28.25-	28.83	1	4094	0.02	99.98
70.25-	71.74	27.66-	28.24	6	4093	0.15	99.95
68.75-	70.24	27.07-	27.65	17	4087	0.42	99.80
67.25-	68.74	26.48-	27.06	30	4070	0.73	99.39
65.75-	67.24	25.89-	26.47	58	4040	1.42	98.66
64.25-	65.74	25.30-	25.88	82	3982	2.00	97.24
62.75-	64.24	24.70-	25.29	108	3900	2.64	95.24
61.25-	62.74	24.11-	24.69	183	3792	4.47	92.60
59.75-	61.24	23.52-	24.10	270	3609	6.59	88.13
58.25-	59.74	22.93-	23.51	269	3339	6.57	81.54
56.75-	58.24	22.34-	22.92	350	3070	8.55	74.97
55.25-	56.74	21.75-	22.33	405	2720	9.89	66.42
53.75-	55.24	21.16-	21.74	476	2315	11.62	56.53
52.25-	53.74	20.57-	21.15	494	1839	12.06	44.91
50.75-	52.24	19.98-	20.56	476	1345	11.62	32.84
49.25-	50.74	19.39-	19.97	412	869	10.06	21.22
47.75-	49.24	18.80-	19.38	251	457	6.13	11.16
46.25-	47.74	18.21-	18.79	122	206	2.98	5.03
44.75-	46.24	17.62-	18.20	59	84	1.44	2.05
43.25-	44.74	17.03-	17.61	21	25	0.51	0.61
41.75-	43.24	16.44-	17.02	4	4	0.10	0.10

Table F-65

Lower Thigh Circumference

--INTERVALS--				--FREQUENCIES--		
CENTIMETERS		INCHES	ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
56.25-	57.74	22.15- 22.73	2	4095	0.05	100.00
54.75-	56.24	21.56- 22.14	7	4093	0.17	99.95
53.25-	54.74	20.96- 21.55	16	4086	0.39	99.78
51.75-	53.24	20.37- 20.95	34	4070	0.83	99.39
50.25-	51.74	19.78- 20.36	65	4036	1.59	98.56
48.75-	50.24	19.19- 19.77	114	3971	2.78	96.97
47.25-	48.74	18.60- 19.18	185	3857	4.52	94.19
45.75-	47.24	18.01- 18.59	206	3672	5.03	89.67
44.25-	45.74	17.42- 18.00	333	3466	8.13	84.64
42.75-	44.24	16.83- 17.41	492	3133	12.01	76.51
41.25-	42.74	16.24- 16.82	561	2641	13.70	64.49
39.75-	41.24	15.65- 16.23	595	2080	14.53	50.79
38.25-	39.74	15.06- 15.64	513	1485	12.53	36.26
36.75-	38.24	14.47- 15.05	451	972	11.01	23.74
35.25-	36.74	13.88- 14.46	300	521	7.33	12.72
33.75-	35.24	13.29- 13.87	170	221	4.15	5.40
32.25-	33.74	12.70- 13.28	34	51	0.83	1.25
30.75-	32.24	12.11- 12.69	10	17	0.24	0.42
29.25-	30.74	11.52- 12.10	7	7	0.17	0.17

Table F-66

Calf Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
45.75-	46.54	18.01-	18.32	4	4095	0.10	100.00
44.95-	45.74	17.70-	18.00	3	4091	0.07	99.90
44.15-	44.94	17.38-	17.69	5	4088	0.12	99.83
43.35-	44.14	17.07-	17.37	13	4083	0.32	99.71
42.55-	43.34	16.75-	17.06	49	4070	1.20	99.39
41.75-	42.54	16.44-	16.74	83	4021	2.03	98.19
40.95-	41.74	16.12-	16.43	111	3938	2.71	96.17
40.15-	40.94	15.81-	16.11	151	3827	3.69	93.46
39.35-	40.14	15.49-	15.80	192	3676	4.69	89.77
38.55-	39.34	15.18-	15.48	297	3484	7.25	85.08
37.75-	38.54	14.86-	15.17	364	3187	8.89	77.83
36.95-	37.74	14.55-	14.85	466	2823	11.38	68.94
36.15-	36.94	14.23-	14.54	469	2357	11.45	57.56
35.35-	36.14	13.92-	14.22	416	1888	10.16	46.11
34.55-	35.34	13.60-	13.91	501	1472	12.23	35.95
33.75-	34.54	13.29-	13.59	333	971	8.13	23.71
32.95-	33.74	12.97-	13.28	269	638	6.57	15.58
32.15-	32.94	12.66-	12.96	170	369	4.15	9.01
31.35-	32.14	12.34-	12.65	114	199	2.78	4.86
30.55-	31.34	12.03-	12.33	49	85	1.20	2.08
29.75-	30.54	11.71-	12.02	28	36	0.68	0.88
28.95-	29.74	11.40-	11.70	8	8	0.20	0.20

Table F-67

Ankle Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
29.75-	30.24	11.71-	11.90	1	4095	0.02	100.00
29.25-	29.74	11.52-	11.70	1	4094	0.02	99.98
28.75-	29.24	11.32-	11.51	4	4093	0.10	99.95
28.25-	28.74	11.12-	11.31	8	4089	0.20	99.85
27.75-	28.24	10.93-	11.11	8	4081	0.20	99.66
27.25-	27.74	10.73-	10.92	25	4073	0.61	99.46
26.75-	27.24	10.53-	10.72	47	4048	1.15	98.85
26.25-	26.74	10.33-	10.52	59	4001	1.44	97.70
25.75-	26.24	10.14-	10.32	101	3942	2.47	96.26
25.25-	25.74	9.94-	10.13	181	3841	4.42	93.80
24.75-	25.24	9.74-	9.93	222	3660	5.42	89.38
24.25-	24.74	9.55-	9.73	323	3438	7.89	83.96
23.75-	24.24	9.35-	9.54	430	3115	10.50	76.07
23.25-	23.74	9.15-	9.34	554	2685	13.53	65.57
22.75-	23.24	8.96-	9.14	505	2131	12.33	52.04
22.25-	22.74	8.76-	8.95	500	1626	12.21	39.71
21.75-	22.24	8.56-	8.75	420	1126	10.26	27.50
21.25-	21.74	8.37-	8.55	340	706	8.30	17.24
20.75-	21.24	8.17-	8.36	177	366	4.32	8.94
20.25-	20.74	7.97-	8.16	106	189	2.59	4.62
19.75-	20.24	7.78-	7.96	52	83	1.27	2.03
19.25-	19.74	7.58-	7.77	22	31	0.54	0.76
18.75-	19.24	7.38-	7.57	9	9	0.22	0.22

Table F-68

Heel-Ankle Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
41.25-	41.84	16.24-	16.47	1	4095	0.02	100.00
40.65-	41.24	16.00-	16.23	0	4094	0.00	99.98
40.05-	40.64	15.77-	15.99	0	4094	0.00	99.98
39.45-	40.04	15.53-	15.76	7	4094	0.17	99.98
38.85-	39.44	15.30-	15.52	20	4087	0.49	99.80
38.25-	38.84	15.06-	15.29	21	4067	0.51	99.32
37.65-	38.24	14.82-	15.05	47	4046	1.15	98.80
37.05-	37.64	14.59-	14.81	130	3999	3.17	97.66
36.45-	37.04	14.35-	14.58	162	3869	3.96	94.48
35.85-	36.44	14.11-	14.34	289	3707	7.06	90.53
35.25-	35.84	13.88-	14.10	383	3418	9.35	83.47
34.65-	35.24	13.64-	13.87	570	3035	13.92	74.11
34.05-	34.64	13.41-	13.63	581	2465	14.19	60.20
33.45-	34.04	13.17-	13.40	492	1884	12.01	46.01
32.85-	33.44	12.93-	13.16	482	1392	11.77	33.99
32.25-	32.84	12.70-	12.92	362	910	8.84	22.22
31.65-	32.24	12.46-	12.69	308	548	7.52	13.38
31.05-	31.64	12.22-	12.45	116	240	2.83	5.86
30.45-	31.04	11.99-	12.21	76	124	1.86	3.03
29.85-	30.44	11.75-	11.98	36	48	0.88	1.17
29.25-	29.84	11.52-	11.74	8	12	0.20	0.29
28.65-	29.24	11.28-	11.51	4	4	0.10	0.10

Table F-69

Instep Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULATIVE-F	PERCENT-FREQ	CUMUL-PCT-FQ
31.45-	31.94	12.38-	12.57	1	4095	0.02	100.00
30.95-	31.44	12.19-	12.37	0	4094	0.00	99.98
30.45-	30.94	11.99-	12.18	6	4094	0.15	99.98
29.95-	30.44	11.79-	11.98	9	4088	0.22	99.83
29.45-	29.94	11.59-	11.78	12	4079	0.29	99.61
28.95-	29.44	11.40-	11.58	27	4067	0.66	99.32
28.45-	28.94	11.20-	11.39	69	4040	1.68	98.66
27.95-	28.44	11.00-	11.19	94	3971	2.30	96.97
27.45-	27.94	10.81-	10.99	150	3877	3.66	94.68
26.95-	27.44	10.61-	10.80	286	3727	6.98	91.01
26.45-	26.94	10.41-	10.60	348	3441	8.50	84.03
25.95-	26.44	10.22-	10.40	533	3093	13.02	75.53
25.45-	25.94	10.02-	10.21	626	2560	15.29	62.52
24.95-	25.44	9.82-	10.01	630	1934	15.38	47.23
24.45-	24.94	9.63-	9.81	505	1304	12.33	31.84
23.95-	24.44	9.43-	9.62	359	799	8.77	19.51
23.45-	23.94	9.23-	9.42	225	440	5.49	10.74
22.95-	23.44	9.04-	9.22	124	215	3.03	5.25
22.45-	22.94	8.84-	9.03	49	91	1.20	2.22
21.95-	22.44	8.64-	8.83	30	42	0.73	1.03
21.45-	21.94	8.44-	8.63	9	12	0.22	0.29
20.95-	21.44	8.25-	8.43	3	3	0.07	0.07

Table F-70

Ball of Foot Circumference

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
30.05-	30.54	11.83-	12.02	2	4094	0.05	100.00
29.55-	30.04	11.63-	11.82	5	4092	0.12	99.95
29.05-	29.54	11.44-	11.62	10	4087	0.24	99.83
28.55-	29.04	11.24-	11.43	13	4077	0.32	99.58
28.05-	28.54	11.04-	11.23	46	4064	1.12	99.27
27.55-	28.04	10.85-	11.03	83	4018	2.03	98.14
27.05-	27.54	10.65-	10.84	135	3935	3.30	96.12
26.55-	27.04	10.45-	10.64	191	3800	4.67	92.82
26.05-	26.54	10.26-	10.44	332	3609	8.11	88.15
25.55-	26.04	10.06-	10.25	435	3277	10.63	80.04
25.05-	25.54	9.86-	10.05	498	2842	12.16	69.42
24.55-	25.04	9.67-	9.85	507	2344	12.38	57.25
24.05-	24.54	9.47-	9.66	459	1837	11.21	44.87
23.55-	24.04	9.27-	9.46	362	1378	8.84	33.66
23.05-	23.54	9.07-	9.26	361	1016	8.82	24.82
22.55-	23.04	8.88-	9.06	179	655	4.37	16.00
22.05-	22.54	8.68-	8.87	175	476	4.27	11.63
21.55-	22.04	8.48-	8.67	128	301	3.13	7.35
21.05-	21.54	8.29-	8.47	62	173	1.51	4.23
20.55-	21.04	8.09-	8.28	51	111	1.25	2.71
20.05-	20.54	7.89-	8.08	38	60	0.93	1.47
19.55-	20.04	7.70-	7.88	14	22	0.34	0.54
19.05-	19.54	7.50-	7.69	3	8	0.07	0.20
18.55-	19.04	7.30-	7.49	5	5	0.12	0.12

Table F-71

Age

--INTERVALS--				--FREQUENCIES--			
CENTIMETERS		INCHES		ACTUAL FREQ	CUMULA TIVE-F	PERCEN T-FREQ	CUMUL- PCT-FQ
32.25-	33.24	32.25-	33.24	1	4095	0.02	100.00
31.25-	32.24	31.25-	32.24	0	4094	0.00	99.98
30.25-	31.24	30.25-	31.24	0	4094	0.00	99.98
29.25-	30.24	29.25-	30.24	1	4094	0.02	99.98
28.25-	29.24	28.25-	29.24	2	4093	0.05	99.95
27.25-	28.24	27.25-	28.24	1	4091	0.02	99.90
26.25-	27.24	26.25-	27.24	4	4090	0.10	99.88
25.25-	26.24	25.25-	26.24	21	4086	0.51	99.78
24.25-	25.24	24.25-	25.24	56	4065	1.37	99.27
23.25-	24.24	23.25-	24.24	104	4009	2.54	97.90
22.25-	23.24	22.25-	23.24	149	3905	3.64	95.36
21.25-	22.24	21.25-	22.24	279	3756	6.81	91.72
20.25-	21.24	20.25-	21.24	725	3477	17.70	84.91
19.25-	20.24	19.25-	20.24	1829	2752	44.66	67.20
18.25-	19.24	18.25-	19.24	682	923	16.65	22.54
17.25-	18.24	17.25-	18.24	241	241	5.89	5.89

APPENDIX G

BIVARIATE TABLES

Table G-1

STATURE BY CHEST CIRCUMF
CHEST CIRCUMF

		29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	TOTAL
	59	1																			1
	61					1		2		1			1								5
	62				1			2	1	1		1									6
	63				3	5	5	1	5	1	2		1								23
	64			1	4	9	8	8	5	8	3	5	1								52
	65			2	11	13	13	26	16	18	12	8	4	1	2	1					127
S	66		2	3	8	21	44	44	40	39	14	11	6	4	4	3	1	2			246
T	67			1	5	33	59	65	59	55	55	33	32	13	12	1	1	2	1		427
A	68			3	9	29	59	102	92	86	69	50	32	19	8	6	1	1		2	568
T	69		1		11	26	51	73	112	95	89	51	38	32	13	9	3	4	2		610
U	70				6	16	43	77	112	89	91	71	49	28	18	10	4	5	1		620
R	71				4	16	29	64	82	94	76	57	37	28	20	9	15	1	3		535
E	72					7	20	34	49	57	45	52	29	23	13	13	3	3	1		349
	73				1	6	12	19	33	40	42	31	21	19	14	8	5	2			253
	74					3	9	10	18	26	20	22	13	11	6	4	2		1		145
	75					1		12	13	11	10	12	6	6	3	7	1	1		1	84
	76						1	4	3	6	2	2	4	2	1	1					26
	77				1		1	1	1	2	3	2	1	2			1				15
	78								1		1			1				1			4
TOTAL		1	3	10	64	186	354	544	642	629	534	409	275	188	114	72	37	22	9	3	4096

Table G-2

	MEAN	STD DEV
STATURE	69.527	2.586
CHEST CIRCUMF	37.130	2.635

NO OF CASES = 4096

MULTIPLE R	.26709
R SQUARE	.07133
ADJUSTED R SQUARE	.07111
STANDARD ERROR	2.49228

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1953.36180	1953.36180
RESIDUAL	4094	25429.60410	6.21145

F = 314.47749 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
CHEST CIRCUMF	.26214	.01478	.26709	17.734	.0000
STATURE	59.79378	.55023		108.670	.0000

Table G-3

STATURE BY SLEEVE LENGTH

		SLEEVE LENGTH													
		27	29	30	31	32	33	34	35	36	37	38	39	40	TOTAL
	59	1													1
	61			3		2									5
	62		1	2		1	1	1							6
	63		3	3	7	6	2	1		1					23
	64		3	2	12	17	12	4	2						52
	65		1	6	22	38	38	17	4	1					127
S	66			8	13	64	87	55	17	2					246
T	67		1	2	26	55	150	123	53	15	2				427
A	68			3	11	53	154	202	113	29	3				568
T	69			2	7	29	117	217	156	66	14		2		610
U	70			1	3	16	76	172	225	106	18	2	1		620
R	71					2	53	110	189	138	35	7	1		535
E	72				2	3	21	55	90	127	39	10	1	1	349
	73					1	4	25	57	92	52	21	1		253
	74						3	16	16	55	36	17	2		145
	75							5	12	23	20	16	8		84
	76								4	4	9	7	1	1	26
	77									1	6	6	1	1	15
	78											3	1		4
	TOTAL	1	9	32	103	287	718	1003	938	660	234	89	19	3	4096

Table G-4

	MEAN	STD DEV
STATURE	69.527	2.586
SLEEVE LENGTH	34.402	1.609

NO OF CASES = 4096

MULTIPLE R	.67013
R SQUARE	.44907
ADJUSTED R SQUARE	.44894
STANDARD ERROR	1.91961

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	12296.98507	12296.98507
RESIDUAL	4094	15086.06082	3.68492

F = 3337.11083 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
SLEEVE LENGTH	1.07672	.01864	.67013	57.768	.0000
STATURE	32.48503	.64192		50.606	.0000

Table G-5

CHEST CIRCUMF BY WAIST CIRCUMF

CHEST CIRCUMF \ WAIST CIRCUMF	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	TOTAL
29	1																						1
30		1		1	1																		3
31			1	3	3	2	1																10
32			2	7	19	19	12	4	1														64
33			1	11	33	62	46	22	7	2	1			1									186
34				10	29	70	114	78	40	11		1	1										354
35			1	1	12	48	120	171	121	48	13	4		3	2								544
36				1	11	26	89	140	165	101	62	34	5	6	2								642
37					3	9	45	110	130	146	91	54	25	15	1								629
38						6	22	46	84	110	102	77	47	24	9	4	2	1					534
39						1	9	16	40	54	81	64	56	48	22	10	5	2		1			409
40						1	1	7	12	21	32	44	49	35	30	19	16	5	1	2			275
41									2	8	15	19	16	27	32	23	21	14	8	3			188
42										1	4	7	13	12	16	24	20	10	5	2			114
43											3		9	9	5	11	11	9	10	3	2		72
44													1	3	5	4	7	9	2	1	3	2	37
45													1		2	2	3	4	8		1	1	22
46															1	1		1	1	3	2		9
47																			1			2	3
TOTAL	1	1	5	34	111	244	459	594	602	502	404	304	223	183	127	98	85	55	36	15	8	5	4096

Table G-6

	MEAN	ST DEV
CHEST CIRCUMF	37.130	2.635
WAIST CIRCUMF	32.083	3.219

NO OF CASES = 4096

MULTIPLE R	.80815
R SQUARE	.65311
ADJUSTED R SQUARE	.65303
STANDARD ERROR	1.55198

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	18565.98036	18565.98036
RESIDUAL	4094	9860.92198	2.40863

F = 7708.11530 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
WAIST CIRCUMF	.66156	7.53520E03	.80815	87.796	.0000
CHEST CIRCUMF	15.90523	.24296		65.464	.0000

Table G-7

CHEST CIRCUMF BY ARM CIRCUMF

CHEST CIRCUMF \ ARM CIRCUMF	10	11	13	14	14.5	15	15.5	16	16.5	17	17.5	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5	23	TOTAL
29	1																						1
30						2		1															3
31						1	4	3	2														10
32				2	3	6	12	22	11	6	1				1								64
C 33		1	1		1	7	33	51	47	25	9	9		1	1								186
H 34				1	2	6	27	75	87	88	35	18	10	2	2	1							354
E 35				2	3	5	13	43	104	173	107	56	26	4	4	2	2						544
S 36			1			4	9	35	84	144	181	103	45	21	11	4							642
T 37					1	5	1	11	57	113	140	146	81	50	11	9	2	1				1	629
38				1		2	2	10	16	51	102	128	105	70	33	10	2	2					534
C 39							2	2	10	23	57	87	94	67	38	19	9				1		409
I 40									3	7	15	41	61	48	40	32	15	2	1	1		1	275
R 41								1	1	4	10	12	35	34	43	23	18	3	2	2			188
C 42									1		4	8	12	14	30	23	15	4	2	1			114
U 43												3	7	11	12	13	18	3	4		1		72
M 44											1			8	6	7	6	4	4			1	37
F 45											1		2	2	2	3	3	5	4				22
46																1	3	5					9
47														1	1	1							3
TOTAL	1	1	2	6	10	38	103	254	423	634	663	611	478	333	243	148	93	29	17	4	2	3	4096

Table G-8

	MEAN	STD DEV
CHEST CIRCUMF	37.130	2.635
ARM CIRCUMF	17.278	1.282

NO OF CASES = 4096

MULTIPLE R	.71697
R SQUARE	.51404
ADJUSTED R SQUARE	.51393
STANDARD ERROR	1.83692

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	14612.67950	14612.67950
RESIDUAL	4094	13814.22285	3.37426

F = 4330.63159 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
ARM CIRCUMF	1.47354	.02239	.71697	65.808	.0000
CHEST CURCUMF	11.67024	.38794		30.082	.0000

Table G-9

CHEST CIRCUMF BY HIP CIRCUMF

		HIP CIRCUMF																			
		30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	49	TOTAL
	29	1																			1
	30			3																	3
	31			4	2	3		1													10
	32		1	5	23	18	13	4													64
C	33		3	9	41	55	45	25	6	1	1										186
H	34			3	42	90	114	71	27	5	2										354
E	35		1		11	65	143	173	108	31	9	2			1						544
S	36				2	43	108	188	164	88	36	11	2								642
T	37			2	2	18	69	147	162	128	61	29	10	1							629
	38					5	20	82	109	135	96	64	16	6	1						534
C	39						5	30	68	91	80	73	32	22	8						409
I	40					1	2	7	22	37	56	68	37	26	15	3	1				275
R	41								6	7	25	47	46	29	18	8	1	1			188
C	42									3	9	22	26	32	13	6	1	2			114
U	43									3	6	9	13	11	16	10	3	1			72
M	44										1	1	3	7	9	9	5	1	1		37
F	45											3	2	6	4	5	1	1			22
	46												1	1	2	2	2	1			9
	47												1			1				1	3
TOTAL		1	5	26	123	298	519	728	672	529	382	329	189	141	87	44	14	7	1	1	4096

Table G-10

	MEAN	STD DEV
CHEST CIRCUMF	37.130	2.635
HIP CIRCUMF	37.354	2.538

NO OF CASES = 4096

MULTIPLE R	.80275
R SQUARE	.64441
ADJUSTED R SQUARE	.64432
STANDARD ERROR	1.57133

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	18318.55386	18318.55386
RESIDUAL	4094	10108.34848	2.46906

F = 7419.22972 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
HIP CIRCUMF	.83328	9.67407E03	.80275	86.135	.0000
CHEST CIRCUMF	6.00392	.36220		16.576	.0000

Table G-11

CHEST CIRCUMF BY INTER DIST
INTER DIST

		10	11	12	13	14	15	16	17	18	19	20	21	TOTAL
	29	1												1
	30				1	1	1							3
C	31				5	3		2						10
H	32				12	24	23	5						64
E	33			3	19	53	63	42	3	2	1			186
S	34			1	20	81	140	93	17	2				354
T	35			3	15	87	203	166	63	6	1			544
	36				15	66	196	233	106	23	2	1		642
C	37		1		6	46	146	235	150	41	3	1		629
I	38				6	20	87	220	151	43	7			534
R	39				2	6	61	148	114	67	6	5		409
C	40				1	3	28	83	90	54	15	1		275
U	41					3	13	44	64	41	19	4		188
M	42					3	8	18	39	33	9	4		114
F	43							11	20	28	8	4	1	72
	44					1	1	5	11	9	5	5		37
	45								7	8	7			22
	46							1	2	4	2			9
	47									1	2			3
TOTAL		1	1	7	102	397	970	1306	837	362	87	25	1	4096

Table G-12

	MEAN	STD DEV
CHEST CIRCUMF	37.130	2.635
INTER DIST	15.956	1.320

NO OF CASES = 4096

MULTIPLE R	.56182
R SQUARE	.31564
ADJUSTED R SQUARE	.31547
STANDARD ERROR	2.17988

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	8972.66597	8972.66597
RESIDUAL	4094	19454.23638	4.75189

F = 1888.23112 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
INTER DIST	1.12149	.02581	.56182	43.454	.0000
CHEST CIRCUMF	19.23582	.41320		46.553	.0000

Table G-13

CHEST CIRCUMF BY SLEEVE LENGTH

		SLEEVE LENGTH													
		27	29	30	31	32	33	34	35	36	37	38	39	40	TOTAL
	29	1													1
	30			1		1			1						3
	31		1	3	3		2		1						10
C	32		2	3	19	12	18	6	2	1	1				64
H	33		1	4	15	45	47	40	22	8	4				186
E	34		1	9	20	48	93	100	55	24	1	3			354
S	35		2	4	20	53	146	159	103	42	10	3	2		544
T	36		2	1	11	48	130	194	143	84	22	7			642
	37			5	7	37	104	164	166	105	29	10	1	1	629
C	38			2	2	20	73	133	158	104	27	12	3		534
I	39				5	12	52	81	116	91	41	9	2		409
R	40					7	28	58	75	67	30	8	1	1	275
C	41				1	2	15	32	47	57	22	8	3	1	188
U	42					2	7	22	23	31	18	9	2		114
M	43						3	5	15	25	11	11	2		72
F	44							2	7	14	7	6	1		37
	45							4	4	5	6	2	1		22
	46							3		1	3	1	1		9
	47									1	2				3
	TOTAL	1	9	32	103	287	718	1003	938	660	234	89	19	3	4096

Table G-14

	MEAN	STD DEV
CHEST CIRCUMF	37.130	2.635
SLEEVE LENGTH	34.402	1.609

NO OF CASES = 4096

MULTIPLE R	.45201
R SQUARE	.20432
ADJUSTED R SQUARE	.20412
STANDARD ERROR	2.35050

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	5808.09165	5808.09165
RESIDUAL	4094	22618.81069	5.52487

F = 1051.26337 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
SLEEVE LENGTH	.73998	.02282	.45201	32.423	.0000
CHEST CIRCUMF	11.67273	.78601		14.851	.0000

Table G-15

Wrist Circumference by Sleeve Length

Wrist Circumference	Sleeve Length													
	27	29	30	31	32	33	34	35	36	37	38	39	40	Total
5.75	1													1
6.00		1												1
6.25			1	1	3	2		2						9
6.50		2	7	9	14	13	12	7	4					68
6.75		4	10	25	49	84	66	45	14	2	1			300
7.00		2	10	48	126	255	284	193	85	18	8			1029
7.25			3	12	58	195	295	245	151	42	10	1		1012
7.50				7	31	106	225	258	201	66	21	2		917
7.75			1	1	6	51	103	163	146	70	25	7	2	575
8.00						9	14	21	41	24	12	5	1	127
8.25						2	3	4	17	12	10	3		51
8.50						1	1		1		2	1		6
TOTAL:	1	9	32	103	287	718	1003	938	660	234	89	19	3	4096

Table G-16

Summary Statistics

		Mean	Std Dev	Regression		Equations	SE Est	R
Y	Wrist Circ	6.67	0.34	0.104*X	+	3.15	0.30	0.484
X	Sleeve Length	33.90	1.59	2.253*Y	+	18.86	1.39	

Table G-17

STATURE BY WAIST CIRCUMF
WAIST CIRCUMF

STATURE	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	TOTAL
59	1																						1
61						1		1		1		2											5
62					1		1	2	1							1							6
63				1	6	2	4	1	3	1	1	3		1									23
64				2	6	7	12	8	3	5	2	4	2	1									52
65				4	11	14	21	25	19	8	12	7	4	1	1								127
66		1	1	5	17	25	50	36	29	27	18	10	7	8	4	2	3	1	1	1			246
67			1	6	11	43	49	72	66	52	37	31	12	12	13	9	9	2	1	1			427
68			1	5	17	47	72	108	88	52	49	41	27	24	7	12	10	3	3	1		1	568
69			1	6	17	26	85	105	88	70	56	42	29	33	14	10	11	8	5	2	1	1	610
70			1	1	11	30	62	81	90	92	76	40	34	33	21	16	16	8	7		1		620
71					5	23	47	78	87	74	48	46	35	23	22	14	12	9	4	6	2		535
72				2	4	10	28	33	51	54	33	34	28	16	17	13	6	7	8	2	3		349
73				1	1	12	11	21	37	31	37	21	10	17	13	13	6	10	4				253
74					3	1	12	14	23	20	15	13	9	8	9	6	5	3	1	1	1	1	145
75					1	3	5	5	10	11	12	4	11	4	3	2	6	3	1	1		2	84
76								3	5	3	4	4	4	1	1		1						26
77				1				1	2	1	3	2	2	1	2								15
78											1		1					1	1				4
TOTAL	1	1	5	34	111	244	459	594	602	502	404	304	223	183	127	98	85	55	36	15	8	5	4096

Table G-18

	MEAN	STD DEV
STATURE	69.527	2.586
WAIST CIRCUMF	32.083	3.219

NO OF CASES = 4096

MULTIPLE R	.26103
R SQUARE	.06813
ADJUSTED R SQUARE	.06791
STANDARD ERROR	2.49657

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1865.72612	1865.72612
RESIDUAL	4094	25517.31978	6.23286

F = 299.33719 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
WAIST CIRCUMF	.20972	.01212	.26103	17.301	.0000
STATURE	62.79855	.39084		160.676	.0000

Table G-19

WAIST CIRCUMF BY HIP CIRCUMF

		HIP CIRCUMF																			
		30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	49	TOTAL
	23	1																			1
	24			1																	1
	25			2	1	1	1														5
W	26		3	6	10	10	4	1													34
A	27		1	10	31	26	32	9	2												111
I	28		1	5	36	77	74	38	12			1									244
S	29			2	34	98	143	131	35	10	4	2									459
T	30				9	55	164	200	124	34	6	2									594
C	31				2	24	79	196	186	83	24	7	1								602
I	32					6	14	105	175	137	48	13	4								502
R	33						4	31	96	143	82	38	6	4							404
C	34						2	11	30	70	96	63	22	8	1	1					304
U	35							3	9	35	67	70	24	11	3			1			223
M	36					1	2	3	1	14	37	62	33	24	5	1					183
F	37								1	3	11	39	37	17	13	6					127
	38								1		5	17	33	24	13	4		1			98
	39										2	13	20	26	19	5					85
	40											2	6	17	16	11	2	1			55
	41												3	6	11	6	6	3	1		36
	42													4	5	4	2				15
	43														1	4	3				8
	44															2	1	1		1	5
	TOTAL	1	5	26	123	298	519	728	672	529	382	329	189	141	87	44	14	7	1	1	4096

Table G-20

	MEAN	STD DEV
WAIST CIRCUMF	32.083	3.219
HIP CIRCUMF	37.354	2.538

NO OF CASES = 4096

MULTIPLE R	.86818
R SQUARE	.75374
ADJUSTED R SQUARE	.75368
STANDARD ERROR	1.59740

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	31974.28024	31974.28024
RESIDUAL	4094	10446.66288	2.55170

F = 12530.57602 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
HIP CIRCUMF	1.10089	9.83462E03	.86818	111.940	.0000
WAIST CIRCUMF	9.03955	.36821		24.550	.0000

Table G-21

WAIST CIRCUMF BY UPPER THIGH CIRCUMF
UPPER CIRCUMF

		16	17	18	19	21	22	23	24	25	26	27	28	29	TOTAL
	23	1													1
	24			1											1
W	25			2	2	1									5
A	26		1	12	13	8									34
I	27			16	38	56	1								111
S	28			15	54	160	9	4	1	1					244
T	29			6	57	323	58	13	2						459
	30		1	4	30	384	132	36	5	2					594
C	31			1	9	291	196	79	20	6					602
I	32			1	5	126	170	146	46	7		1			502
R	33					57	111	129	79	27	1				404
C	34					20	52	87	105	30	9	1			304
U	35					6	24	60	72	42	10	7	2		223
M	36					7	6	41	55	50	18	6			183
F	37					1	7	12	33	41	21	9	3		127
	38					2	1	9	19	33	20	10	4		98
	39							5	18	33	15	11	3		85
	40							2	5	16	14	16	2		55
	41								3	8	9	8	8		36
	42								2	2	5	4	2		15
	43									2	2	2	2		8
	44							1	1	1				2	5
TOTAL		1	2	58	208	1442	767	624	466	301	124	75	26	2	4096

Table G-22

	MEAN	STD DEV
WAIST CIRCUMF	32.083	3.219
UPPER CIRCUMF	22.290	1.854

NO OF CASES = 4096

MULTIPLE R	.80283
R SQUARE	.64453
ADJUSTED R SQUARE	.64444
STANDARD ERROR	1.91919

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	27341.50163	27341.50163
RESIDUAL	4094	15079.44149	3.68330

F = 7423.09374 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
UPPER CIRCUMF	1.39378	.01618	.80283	86.157	.0000
WAIST CIRCUMF	1.01610	.36183		2.808	.0050

Table G-23

WAIST CIRCUMF BY FLY DROP

		FLY DROP																			
		6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	TOTAL
	23	1																			1
	24										1										1
	25									1			3		1						5
	26		1	2	1	4	3	3	6	3		3	3		2	2	1				34
	27	3	3	3	4	5	10	14	11	14	9	9	4	5	5	4	1	4	2	1	111
W	28	9	3	6	18	11	14	15	23	32	20	29	21	19	11	2	2	4	1	4	244
A	29	12	4	14	14	40	36	46	52	43	41	37	34	26	18	14	11	7	2	8	459
I	30	17	12	18	29	40	51	58	61	65	55	46	44	33	28	18	8	6	2	3	594
S	31	29	15	14	30	32	30	50	69	47	47	53	56	45	20	27	9	10	10	9	602
T	32	20	16	8	29	33	34	54	42	44	33	39	50	30	24	18	9	8	5	6	502
	33	10	15	13	19	33	26	44	45	34	36	32	22	16	15	14	12	8	2	8	404
C	34	13	11	12	15	20	25	23	27	21	30	29	20	22	13	7	8	3	1	4	304
I	35	7	4	4	19	14	10	20	26	15	21	17	17	14	13	10	6	2	4		223
R	36	7	3	4	11	15	9	17	15	15	22	9	15	13	9	7	6	2	2	2	183
C	37	7	7	2	5	11	5	13	7	14	10	13	3	7	9	5	7	1		1	127
U	38	4	5	6	5	7	5	10	7	5	4	7	9	8	7	5	1	2		1	98
M	39	5	2	3	5	6	6	7	6	9	6	8	6	5	6	2	1	1	1		85
F	40	2	2	2	5	3	3	4	6	4	5	3	4	3	3	2	1	2		1	55
	41	2	1	1	1	2	2	2	4	6	3	4	3	1				3		1	36
	42	3		2		1	1			1	2	1	2	1		1					15
	43			1					3	1			1		2						8
	44	1			1	1										1	1				5
TOTAL		152	104	115	211	278	270	380	410	374	345	339	317	248	186	139	84	63	32	49	4096

Table G-24

	MEAN	STD DEV
WAIST CIRCUMF	32.083	3.219
FLY DROP	9.978	2.020
NO OF CASES =	4096	

Table G-25

STATURE BY KNEE HEIGHT
KNEE HEIGHT

STATURE	14	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5	23	23.5	24	24.5	25	25.5	TOTAL
59	1																	1
61		1		1	3													5
62			1	2	2					1								6
63				2	6	7	8											23
64				2	4	21	15	7	1	1	1							52
65				2	7	28	58	23	6	2				1				127
66			1	2	7	27	74	75	40	17	3							246
67			2	1	5	27	85	120	109	56	16	5		1				427
68			1		4	15	56	152	165	124	43	6	2					568
69					1	9	38	112	146	182	86	30	3		2	1		610
70					1	1	25	58	109	191	159	64	7	3	1		1	620
71						2	9	35	45	138	162	98	37	8		1		535
72							2	13	31	55	97	90	42	18			1	349
73							1	7	8	22	53	70	54	32	6			253
74								1	6	7	19	32	44	25	9	2		145
75							1	1	2	1	5	16	22	20	10	3	3	84
76										1	3	4	6	6	3	2	1	26
77											1	1	1	6	2	1	3	15
78										1					2		1	4
TOTAL	1	1	5	12	40	137	372	604	668	799	648	416	218	120	35	10	10	4096

Table G-26

	MEAN	STD DEV
STATURE	69.527	2.586
KNEE HEIGHT	21.384	1.057

NO OF CASES = 4096

MULTIPLE R	.73880
R SQUARE	.54582
ADJUSTED R SQUARE	.54571
STANDARD ERROR	1.74293

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	14946.32671	14946.32671
RESIDUAL	4094	12436.71919	3.03779

F = 4920.12890 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
KNEE HEIGHT	1.80806	.02578	.73880	70.144	.0000
STATURE	30.86356	.55187		55.925	.0000

Table G-27

STATURE BY CROTCH HEIGHT

		CROTCH HEIGHT															
		25	27	28	29	30	31	32	33	34	35	36	37	38	39	40	TOTAL
	59	1															1
	61		2	2	1												5
	62			2	2	2											6
	63		1	2	7	9	4										23
	64			1	8	22	16	5									52
	65		1		7	50	44	25									127
S	66			4	9	39	80	85	25	2	2						246
T	67		1	3	5	33	115	170	86	12	1	1					427
A	68			1	2	14	67	218	195	60	10	1					568
T	69				3	5	41	131	243	149	34	4					610
U	70					8	18	66	200	221	95	12					620
R	71					2	9	31	104	193	151	41	2	1	1		535
E	72						3	13	52	112	117	43	7	2			349
	73						1	2	10	41	111	57	22	9			253
	74							1	3	6	39	61	25	7	2	1	145
	75								2	2	12	22	33	9	3	1	84
	76							1			1	10	7	4	3		26
	77											3	5	6	1		15
	78													3	1		4
	TOTAL	1	5	15	44	184	398	748	920	798	573	255	101	41	11	2	4096

Table G-28

	MEAN	STD DEV
STATURE	69.527	2.586
CROTCH HEIGHT	33.247	1.822

NO OF CASES = 4096

MULTIPLE R	.79635
R SQUARE	.63417
ADJUSTED R SQUARE	.63408
STANDARD ERROR	1.56426

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	17365.41264	17365.41264
RESIDUAL	4094	10017.63326	2.44691

F = 7096.88581 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
CROTCHHT	1.13047	.01342	.79635	84.243	.0000
STATURE	31.94192	.44682		71.488	.0000

Table G-29

NECK CIRCUMF BY SLEEVE LENGTH

		SLEEVE LENGTH													
		27	29	30	31	32	33	34	35	36	37	38	39	40	TOTAL
N	12	1													1
E	12.5				2		1								3
C	13			1	5	2	5	3	3						19
K	13.5		1	3	16	17	20	21	7	4	2				91
	14		4	9	24	63	93	115	64	28	4	1			405
C	14.5		4	7	24	82	179	210	172	92	16	7			783
I	15			7	20	64	217	277	251	167	53	14	1		11072
R	15.5			3	7	38	118	220	244	174	61	19	6	1	891
C	16			2	3	14	65	102	115	111	49	22	3	1	487
U	16.5				2	5	16	41	61	56	31	16	5		233
M	17					1	4	9	18	32	10	6	2		82
F	17.5							2	3	4	7	3	2		21
	18					1		3		2	1	1			9
	TOTAL	1	9	32	103	287	718	1003	938	660	234	89	19	3	4096

Table G-30

	MEAN	STD DEV
NECK CIRCUMF	14.632	.797
SLEEVE LENGTH	34.402	1.609

NO OF CASES = 4096

MULTIPLE R	.37945
R SQUARE	.14398
ADJUSTED R SQUARE	.14377
STANDARD ERROR	.73775

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	374.78925	374.78925
RESIDUAL	4094	2228.25543	.54427

F = 688.60472 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
SLEEVE LENGTH	.18797	7.16331E03	.37945	26.241	.0000
NECK CIRCUMF	8.16532	.24670		33.098	.0000

Table G-31

NECK CIRCUMF BY SLEEVE INSEAM
SLEEVE INSEAM

		15	16	17	17.5	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5	23	TOTAL
N	12	1															1
E	12.5					1			1		1						3
C	13			1			3	4	3	2	5			1			19
K	13.5		1	1	6	6	14	9	15	19	11	2	5	2			91
	14				6	26	38	59	99	66	60	25	19	4	3		405
C	14.5		1	5	8	41	54	121	161	142	143	54	36	13	3	1	783
I	15		1	4	13	45	78	150	231	185	187	102	47	17	11		11072
R	15.5		2	5	4	27	59	109	186	158	160	78	71	19	10	3	891
C	16		1		8	12	31	60	87	107	73	50	41	10	6	1	487
U	16.5				1	6	14	26	45	45	41	24	17	9	2	3	233
M	17					4	4	7	12	13	20	15	4	2	1		82
F	17.5						2		1	5	3	4	2	3		1	21
	18					1		3	1			1	1		1		8
	TOTAL	1	6	16	46	169	297	548	842	742	704	355	243	80	37	10	4096

Table G-32

	MEAN	STD DEV
NECK CIRCUMF	14.632	.797
SLEEVE INSEAM	19.357	1.020

NO OF CASES = 4096

MULTIPLE R	.14050
R SQUARE	.01974
ADJUSTED R SQUARE	.01950
STANDARD ERROR	.78947

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	51.38620	51.38620
RESIDUAL	4094	2551.65848	.62327

F = 82.44641 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
SLEEVE INSEAM	.10979	.01209	.14050	9.080	.0000
NECK CIRCUMF	12.50686	.23438		53.362	.0000

Table G-33

NECK CIRCUMF BY CHEST CIRCUMF
CHEST CIRCUMF

		29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	TOTAL
C	12	1																			1
H	12.5			2						1											3
E	13		2	2	3	5	4	1	1			1									19
S	13.5			1	10	26	26	17	4	4		2									91
T	14			4	32	73	103	83	56	33	11	8			1		1				405
	14.5				15	54	121	176	158	119	70	38	18	10	3	1					783
C	15			1	1	23	74	172	239	212	165	92	55	23	11	2	1	1			1072
I	15.5				3	5	22	79	141	181	172	117	76	49	26	10	8	2			891
R	16						4	15	38	60	87	104	69	54	32	12	5	4	2	1	487
C	16.5							1	5	18	23	38	41	34	30	25	10	6	2		233
U	17									1	6	9	11	14	8	15	8	6	2	2	82
M	17.5												3	4	3	5	3	2	1		21
F	18												2			2	1	1	2		8
	TOTAL	1	3	10	64	186	354	544	642	629	534	409	275	188	114	72	37	22	9	3	4096

Table G-34

	MEAN	STD DEV
NECK CIRCUMF	14.632	.797
CHEST CIRCUMF	37.130	2.635

NO OF CASES = 4096

MULTIPLE R	.65963
R SQUARE	.43511
ADJUSTED R SQUARE	.43498
STANDARD ERROR	.59930

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1132.62164	1132.62164
RESIDUAL	4094	1470.42304	.35917

F = 3153.48226 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
CHEST CIRCUMF	.19961	3.55453E03	.65963	56.156	.0000
NECK CIRCUMF	7.22066	.13231		54.573	.0000

Table G-35

NECK CIRCUMF BY VERTICAL TRUNK
VERTICAL TRUNK

		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
N	12	1																										1
E	12.5					1					1						1											3
C	13		1	2		1	3	1	5	4			1	1														19
K	13.5		4	1	6	8	12	14	15	7	7	8	3	4	1	1												91
	14			5	5	16	23	37	61	64	50	47	46	28	7	11	3		2									405
C	14.5			2	4	13	21	39	70	92	124	103	111	79	65	27	17	7	3	3	1	1	1					783
I	15			1	1	3	15	22	50	77	130	141	149	131	155	92	49	29	19	6		1	1					1072
R	15.5						7	6	10	38	53	85	117	116	115	109	81	82	33	20	14	2	3					891
C	16						1		5	11	16	23	46	34	67	72	65	41	49	21	15	11	5	3	2			487
U	16.5									1	3	5	6	19	20	24	33	35	32	19	16	7	7	5			1	233
M	17											2	1	2	3	8	12	15	8	8	8	9	2	1	1	2		82
F	17.5														1	1	2	1	2	4	3	3	2		2			21
	18																1	1	2	2	1		1					8
TOTAL		1	5	11	16	42	82	119	216	294	384	414	480	414	434	345	264	211	150	83	58	34	22	9	5	2	1	4096

Table G-36

	MEAN	STD DEV
NECK CIRCUMF	14.632	.797
VERTICAL TRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.62439
R SQUARE	.38987
ADJUSTED R SQUARE	.38972
STANDARD ERROR	.62284

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1014.84270	1014.84270
RESIDUAL	4094	1588.20198	.38793

F = 2616.01865 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	.13933	2.72413E03	62439	51.147	.0000
NECK CIRCUMF	5.62980	.17628		31.937	.0000

Table G-37

NECK CIRCUMF BY WRIST CIRCUMF
WRIST CIRCUMF

		5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.5	TOTAL
N	12	1												1
E	12.5						3							3
C	13			1	2	4	10	1		1				19
K	13.5		1	3	10	28	35	11	2		1			91
	14			3	28	96	169	82	22	4		1		405
C	14.5			1	21	78	315	232	110	23	2	1		783
I	15				5	71	298	326	265	101	5	1		1072
R	15.5			1	2	17	143	250	285	166	20	6	1	891
C	16					5	45	85	146	158	35	12	1	487
U	16.5					1	10	19	65	83	38	16	1	233
M	17						1	6	19	27	18	9	2	82
F	17.5								2	8	7	4		21
	18								1	4	1	1	1	8
	TOTAL	1	1	9	68	300	1029	1012	917	575	127	51	6	4096

Table G-38

	MEAN	STD DEV
NECK CIRCUMF	14.632	.797
WRIST CIRCUMF	6.799	.354

NO OF CASES = 4096

MULTIPLE R	.59533
R SQUARE	.35442
ADJUSTED R SQUARE	.35426
STANDARD ERROR	.64068

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	922.55919	922.55919
RESIDUAL	4094	1680.48549	.41048

F = 2247.53937 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
WRIST CIRCUMF	1.33937	.02825	.59533	47.408	.0000
NECK CIRCUMF	5.52585	.19234		28.729	.0000

Table G-39

NECK CIRCUMF BY INTER DIST

		INTER DIST												
		10	11	12	13	14	15	16	17	18	19	20	21	TOTAL
N	12	1												1
E	12.5				1			2						3
C	13			2	3	6	4	3	1					19
K	13.5		1		13	18	34	20	4	1				91
	14			2	24	92	137	105	34	8	2	1		405
C	14.5			3	26	106	228	257	115	42	4	2		783
I	15				21	101	290	371	199	72	14	4		1072
R	15.5				11	58	172	306	233	89	17	4	1	891
C	16				3	12	74	167	139	64	21	7		487
U	16.5					4	20	57	81	53	15	3		233
M	17						9	13	27	25	5	3		82
F	17.5						2	4	3	5	7			21
	18							1	1	3	2	1		8
	TOTAL	1	1	7	102	397	970	1306	837	362	87	25	1	4096

Table G-40

	MEAN	STD DEV
NECK CIRCUMF	14.632	.797
INTER DIST	15.956	1.320

NO OF CASES = 4096

MULTIPLE R	.40588
R SQUARE	.16474
ADJUSTED R SQUARE	.16453
STANDARD ERROR	.72875

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	428.81598	428.81598
RESIDUAL	4094	2174.22870	.53108

F = 807.44617 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
INTER DIST	.24517	8.62809E03	.40588	28.416	.0000
NECK CIRCUMF	10.72022	.13814		77.606	.0000

Table G-41

NECK CIRCUMF BY FULL BACK

	FULL BACK														
	16	21	22	23	24	25	26	27	28	29	30	31	32	33	TOTAL
12	1														1
12.5						2	1								3
13				2	1	7	6	3							19
13.5		1	1	1	15	25	25	12	9	1	1				91
14			2	20	44	82	116	94	30	12	3	2			405
14.5		1	2	15	45	165	232	171	112	31	7	1		1	783
15			3	7	53	202	271	256	190	58	24	8			1072
15.5			3	7	24	107	231	237	166	80	32	4			891
16			2	1	10	52	99	113	113	73	16	6	1	1	487
16.5				1	2	12	35	60	58	41	18	4	2		233
17				1	1	3	13	18	14	16	11	4	1		82
17.5					1	1	1	3	4	6	4	1			21
18							2	2	3				1		8
TOTAL	1	2	13	55	196	658	1032	969	699	318	116	30	5	2	4096

Table G-42

	MEAN	STD DEV
NECK CIRCUMF	14.632	.797
FULL BACK	26.657	1.566

NO OF CASES = 4096

MULTIPLE R	.32886
R SQUARE	.10815
ADJUSTED R SQUARE	.10793
STANDARD ERROR	.75303

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	281.52159	281.52159
RESIDUAL	4094	2321.52309	.56705

F = 496.46260 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
FULL BACK	.16748	7.51651E03	.32886	22.281	.0000
NECK CIRCUMF	10.16756	.20071		50.657	.0000

Table G-43

WEIGHT BY STATURE
STATURE

		59	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
	95	1					1		1			1					1				5
	105				1	1			2												4
	115		1	1	5	7	8	10	8	3	3										46
	125		1	2	7	13	25	40	38	33	18	3	7								187
	135			1	4	12	25	60	73	97	82	54	29	10	5	2	1				455
	145		1	1	4	11	35	58	100	125	125	107	65	31	24	12	4		1		704
	155		2		1	5	19	35	91	121	126	126	110	67	31	21	5	1			761
W	165				1	1	7	22	48	82	99	119	97	56	42	26	12	5	1		618
E	175					2	6	7	26	45	61	81	84	67	47	20	17	5	2	1	471
I	185			1				6	19	34	44	61	54	44	33	19	10	6	3		334
G	195						1	6	16	17	26	31	40	25	25	18	9	4	4		222
H	205							2	3	10	18	21	21	17	22	12	11	3	2	1	143
T	215								1		6	10	19	16	11	6	5	1	1	1	77
	225								1		2	6	6	13	7	7	4	1			47
	235									1			3	3	5		2				14
	245																1		1	1	3
	255														1	2					3
	265																1				1
	275																1				1
	TOTAL	1	5	6	23	52	127	246	427	568	610	620	535	349	253	145	84	26	15	4	4096

Table G-44

	MEAN	STD DEV
WEIGHT	161.687	23.599
STATURE	69.527	2.586

NO OF CASES = 4096

MULTIPLE R	.48748
R SQUARE	.23764
ADJUSTED R SQUARE	.23745
STANDARD ERROR	20.60754

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	541940.19418	541940.19418
RESIDUAL	4094	1738602.55484	424.67067

F = 1276.14166 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
STATURE	4.44872	.12453	.48748	35.723	.0000
WEIGHT	147.61831	8.66439		17.037	.0000

Table G-45

STATURE BY VERTICAL TRUNK
VERTICAL TRUNK

STATURE	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
59	1																										1
61						1		1	1	2																	5
62						1		3		1					1												6
63		1	1		4		2	8	2	2	1				1	1											23
64		1	1	3	5	5	2	9	8	11	5	1	1														52
65		1	2	1	4	8	11	18	26	17	17	14	1	4	2		1										127
66		1	2	5	7	14	14	29	38	37	29	23	18	15	7	2	1	4									246
67		1	4	2	8	12	17	27	36	64	73	66	41	33	20	14	5	2	1			1					427
68				4	4	20	21	43	60	76	64	80	66	60	28	17	15	6	4								568
69			1	1	8	11	18	25	50	67	80	81	82	56	46	34	27	11	6	3	2	1					610
70					1	8	16	23	32	43	64	84	76	88	64	44	32	24	13	3	2	1	1		1		620
71						2	13	13	27	31	45	71	51	69	73	51	29	23	8	13	8	6		2			535
72					1		3	7	8	23	21	27	29	52	39	39	38	28	13	10	4	4	2	1			349
73							2	4	5	8	4	18	25	31	34	35	33	21	14	9	7	1	2				253
74								3		2	5	11	16	17	19	14	14	16	9	7	6	2	3	1			145
75								3	1		5	2	8	7	8	10	9	8	6	8	2	4		1	1	1	84
76												2		1	1	2	5	5	6	2	1		1				26
77											1			1	2	1	2	2	3	2	1						15
78																				1	1	2					4
TOTAL	1	5	11	16	42	82	119	216	294	384	414	480	414	434	345	264	211	150	83	58	34	22	9	5	2	1	4096

Table G-46

	MEAN	STD DEV
STATURE	69.527	2.586
VERTICAL TRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.52915
R SQUARE	.28000
ADJUSTED R SQUARE	.27983
STANDARD ERROR	2.19449

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	7667.27672	7667.27672
RESIDUAL	4094	19715.76917	4.81577

F = 1592.11800 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	.38297	9.59803E03	.52915	39.901	.0000
STATURE	44.78265	.62108		72.104	.0000

Table G-47

CHEST CIRCUMF BY VERTICAL TRUNK
VERTICAL TRUNK

		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
	29	1																										1
	30			1				2																				3
	31			1		1	3		4		1																	10
	32		1	1	2	6	6	3	9	16	4	8	4	2	1	1												64
C	33		2	2	4	6	13	18	32	28	29	20	14	12	3	2	1											186
H	34		1	4	5	11	18	24	37	43	60	45	45	32	14	9	3	1	2									354
E	35		1	2	4	7	16	21	38	62	82	68	92	56	51	23	10	7	3	1								544
S	36				1	7	14	18	40	51	77	91	75	81	77	46	29	17	13	2	3							642
T	37					2	8	20	29	45	59	76	82	82	83	53	53	19	11	6			1					629
	38					1	2	10	17	26	38	47	87	73	68	56	41	28	23	8	3	4	2					534
C	39					1	2	2	9	12	22	35	42	40	54	63	42	41	25	12	2	3	2					409
I	40							1	1	4	9	15	16	16	45	43	32	40	23	15	7	4	2	2				275
R	41									4	3	6	12	13	23	24	22	18	19	16	15	9	2	2				188
C	42									3		2	7	4	9	14	18	17	16	8	9	4		1	1		1	114
U	43												3	2	3	7	8	12	7	8	11	3	4	3	1			72
M	44												1		2	1	2	8	4	2	6	6	4		1			37
F	45											1		1	1	2	2	1	2	4		1	3	1	2	1		22
	46																1	1	2	1	2		2					9
	47															1		1								1		3
TOTAL		1	5	11	16	42	82	119	216	294	384	414	480	414	434	345	264	211	150	83	58	34	22	9	5	2	1	4096

Table G-48

	MEAN	STD DEV
CHEST CIRCUMF	37.130	2.635
VERTICAL TRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.61039
R SQUARE	.37258
ADJUSTED R SQUARE	.37243
STANDARD ERROR	2.08723

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	10591.27769	10591.27769
RESIDUAL	4094	17835.62466	4.35653

F = 2431.12824 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	.45011	9.12892E03	.61039	49.306	.0000
CHEST CIRCUMF	0.04769	.59073		13.623	.0000

Table G-49

CROTCH HEIGHT BY VERTICAL TRUNK
VERTICAL TRUNK

		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
	25	1																										1
C	27						1				2			1			1											5
R	28						1		4	3	1	1			1	4												15
O	29		1			1	1		4	2	6	10	4	3	4	3	2	1	1	1								44
T	30			1	2	5	3	5	21	23	29	17	19	16	11	10	6	9	6	1								184
C	31		1	2	2	8	13	14	29	36	36	43	50	35	38	33	20	19	6	5	3	1	3	1				398
H	32		2	3	5	7	21	27	46	62	87	93	91	88	65	47	39	23	17	13	2	4	3	1	1	1		748
	33		1	4	5	13	25	28	34	74	90	98	114	92	98	68	51	49	36	11	15	8	4	2				920
H	34			1	2	3	10	18	43	53	72	78	91	80	100	73	69	45	24	15	9	7	2	1	2			798
E	35					3	4	21	18	29	44	45	75	58	67	59	37	35	33	19	9	6	4	3	2	1	1	573
I	36					2	3	5	11	11	14	20	21	22	33	31	23	14	16	9	13	3	3	1				255
G	37							1	5	1	3	5	8	14	11	12	12	13	7	5	1	3						101
H	38											2	5	4	6	3	3	3	4	3	4	2	2					41
T	39											2	1	1		2	1			1	2		1					11
	40								1				1															2
TOTAL		1	5	11	16	42	82	119	216	294	384	414	480	414	434	345	264	211	150	83	58	34	22	9	5	2	1	4096

Table G-50

	MEAN	STD DEV
CROTCH HEIGHT	33.247	1.822
VERTICAL TRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.23459
R SQUARE	.05503
ADJUSTED R SQUARE	.05480
STANDARD ERROR	1.77100

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	747.82716	747.82716
RESIDUAL	4094	12840.64330	3.13645

F = 238.43076 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	.11961	7.74584E03	.23459	15.441	.0000
CROTCH HEIGHT	25.51955	.50123		50.914	.0000

Table G-51

WEIGHT BY VERTICAL TRUNK
VERTICAL TRUNK

		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
	95	1								3		1																5
	105					2			2																			4
	115		2	3	2	6	5	4	11	8	4	1																46
	125		3	3	6	12	20	18	36	40	29	14	4	2														187
	135			5	3	13	22	27	46	65	96	67	60	36	11	4												455
	145				5	6	22	40	62	73	95	130	111	78	53	19	7	3										704
	155					3	9	22	38	55	83	99	139	119	97	55	20	11	9	1			1					761
W	165						4	7	16	29	48	49	76	92	110	82	61	30	12	2								618
E	175							1	5	12	19	29	42	44	75	86	71	48	24	11	3		1					471
I	185									7	6	18	29	19	50	56	48	45	33	15	5	3						334
G	195									2	3	4	16	17	23	24	32	34	29	16	15	5	2					222
H	205										1	2	2	6	12	14	11	26	22	20	14	7	4	1	1			143
T	215												1	1	2	4	10	8	12	7	12	9	5	5			1	77
	225														1		4	3	8	8	4	7	5	3	3	1		47
	235															1		3	1	1	3	2	3					14
	245																			1	1		1					3
	255																				1	1			1			3
	265																			1								1
	275																									1		1
	TOTAL	1	5	11	16	42	82	119	216	294	384	414	480	414	434	345	264	211	150	83	58	34	22	9	5	2	1	4096

Table G-52

	MEAN	STD DEV
WEIGHT	161.687	23.599
VERTICALTRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.72613
R SQUARE	.52726
ADJUSTED R SQUARE	.52714
STANDARD ERROR	16.22770

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1202435.61595	1202435.61595
RESIDUAL	4094	1078107.13307	263.33833

F = 4566.12452 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	4.79601	.07098	.72613	67.573	.0000
WEIGHT	148.18611	4.59275		32.265	.0000

Table G-53

INTER DIST BY VERTICAL TRUNK
VERTICAL TRUNK

		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
I	10	1																										1
N	11								1																			1
T	12						1		1	1		3	1															7
E	13		2			6	3	3	11	9	13	16	12	8	6	5	2	2	2	1	1							102
R	14		1	3	4	4	15	11	37	51	52	42	51	45	31	22	13	7	6	1		1						397
	15		1	4	6	16	19	38	55	87	118	112	112	109	105	66	47	28	21	11	7	4	3	1				970
D	16		1	3	5	13	30	45	56	83	120	129	172	144	144	115	91	63	45	18	12	10	4	2				11306
I	17			1	1	3	11	16	43	44	56	76	90	68	101	79	65	68	49	29	16	8	7	4	1	1		837
S	18						3	5	9	15	17	31	26	32	39	46	34	37	19	15	16	9	6	1	1	1		362
T	19								3	3	7	3	12	6	7	9	8	5	7	8	3	1	1	1	3			87
	20							1		1	1	2	4	2	1	3	4		1		3	1	1					25
	21																	1										1
TOTAL		1	5	11	16	42	82	119	216	294	364	414	480	414	434	345	264	211	150	83	58	34	22	9	5	1	4096	

Table G-54

	MEAN	STD DEV
INTER DIST	15.956	1.320
VERTICAL TRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.29429
R SQUARE	.08661
ADJUSTED R SQUARE	.08638
STANDARD ERROR	1.26159

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	617.83630	617.83630
RESIDUAL	4094	6516.07679	1.59162

F = 388.18171 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	.10871	5.51783E03	.29429	19.702	.0000
INTER DIST	8.93148	.35705		25.014	.0000

Table G-55

CERVICLE HEIGHT BY VERTICAL TRUNK
VERTICAL TRUNK

		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
	48	1																										1
	50										1																	1
	51					1	1		1								1											4
C	52				1		1		5		2	1																10
E	53		1			1	1	1	3	2	4	1	1			1		1										17
R	54			1	1	3	1		11	5	9	5	3	2	3			1										45
V	55		2	2	1	4	4	9	17	25	17	23	9	4	5	3		1										126
I	56		1	2	2	5	14	12	25	38	44	37	45	20	16	8	4	5	1									279
C	57		1	3	5	8	12	18	38	39	51	65	55	46	27	18	14	9	8	3	1		1					422
L	58			2	5	11	22	23	39	43	80	74	86	74	59	46	27	15	9	2	1		1					619
E	59			1	1	6	12	18	22	50	68	79	75	87	86	50	29	30	17	8	1	2	1					643
	60					1	9	17	23	48	50	47	62	63	81	60	51	35	20	9	9	4	1	1		1		592
H	61					2	5	11	13	28	22	42	80	55	62	69	51	30	27	13	13	5	7	2				537
E	62							10	9	11	25	23	28	28	42	41	40	30	23	12	8	6	3	2	2			343
I	63								6	5	10	7	20	23	33	27	20	28	22	15	7	7		2	2			234
G	64								3		1	6	9	7	10	12	18	16	11	9	8	6	2	1				119
H	65								1			3	5	5	8	8	7	4	8	7	6		3	1	1	1	1	69
T	66												2		2	1	1	5	4	1	3	4	2					25
	67											1						1		4								6
	68															1	1				1		1					4
TOTAL		1	5	11	16	42	82	119	216	294	384	414	480	414	434	345	264	211	150	83	58	34	22	9	5	2	1	4096

Table G-56

	MEAN	STD DEV
CERVICLE HEIGHT	59.402	2.511
VERTICAL TRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.47287
R SQUARE	.22360
ADJUSTED R SQUARE	.22341
STANDARD ERROR	2.21284

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	5773.59204	5773.59204
RESIDUAL	4094	20046.95386	4.89667

F = 1179.08616 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	.33233	9.67831E03	.47287	34.338	.0000
CERVICLE HEIGHT	37.92968	.62628		60.564	.0000

Table G-57

HIP CIRCUMF BY VERTICAL TRUNK
VERTICAL TRUNK

		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
	30	1																										1
	31						1	1	2	1																		5
	32		2	1	1	3	5	3	7	2	1				1													26
H	33		2	3	5	11	8	8	17	33	19	14	1	1		1												123
I	34		1	6	3	10	21	24	47	44	50	37	30	13	9	2			1									298
P	35			1	4	12	23	30	47	59	88	87	75	50	24	12	6	1										519
	36				3	3	14	25	54	70	88	105	113	103	83	42	13	9	3									728
C	37					2	7	21	19	38	69	79	111	92	93	67	37	22	11	2	1		1					672
I	38					1	3	5	17	22	37	38	60	76	74	69	61	40	19	5	1		1					529
R	39							2	4	15	18	32	43	30	55	55	51	32	20	16	6	2	1					382
C	40								2	6	10	11	30	26	49	51	41	46	31	16	5	2	2	1				329
U	41									1	2	9	13	12	21	14	26	21	29	13	17	8	1		1		1	189
M	42									3	2	1	3	9	17	18	20	19	20	9	8	8	1	3				141
F	43											1		2	6	12	6	11	5	12	10	9	11	1	1			87
	44												1		2	1	2	7	7	5	9	3	1	3	2	1		44
	45																	2	3	3	1		3	1	1			14
	46															1	1		1	2		2						7
	47																	1										1
	49																									1		1
TOTAL		1	5	11	16	42	82	119	216	294	384	414	480	414	434	345	264	211	150	83	58	34	22	9	5	2	1	4096

Table G-58

	MEAN	STD DEV
HIP CIRCUMF	37.354	2.538
VERTICAL TRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.67599
R SQUARE	.45696
ADJUSTED R SQUARE	.45683
STANDARD ERROR	1.87068

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	12055.71223	12055.71223
RESIDUAL	4094	14326.68987	3.49944

F = 3445.04462 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	.48023	8.18179E03	.67599	58.695	.0000
HIP CIRCUMF	6.32607	.52944		11.949	.0000

Table G-59

WAIST CIRCUMF BY VERTICAL TRUNK
VERTICAL TRUNK

		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	TOTAL
	23	1																										1
	24							1																				1
W	25					2		1	1		1																	5
A	26		2	1	2	3	2	4	7	3	3	2	2	1	1	1												34
I	27		2	2	2	6	14	7	21	22	14	11	2	3	4	1												111
S	28			4	4	9	19	22	29	38	39	21	26	15	12	3	1		2									244
T	29			2	3	9	12	29	54	62	63	71	68	43	22	12	7	2										459
	30		1	1	4	8	16	19	53	65	78	92	95	66	44	29	9	7	5	2								594
C	31			1		4	13	21	18	43	77	75	89	81	69	48	27	23	9	1	1		2					602
I	32						3	7	13	23	51	51	73	74	81	51	37	21	12	4		1						502
R	33					1	1	5	7	16	25	30	59	47	59	57	44	28	15	7	2	1						404
C	34				1		1	3	5	7	19	27	20	35	42	46	36	22	19	11	7	2	1					304
U	35						1		3	4	9	17	14	14	34	33	27	28	18	9	7	3	1	1				223
M	36								5	5	1	9	12	17	29	19	34	19	13	9	7	3	1					183
F	37									2	3	4	10	8	15	14	8	22	13	13	9	6						127
	38									3		2	5	3	7	15	13	15	10	8	9	4	1	2			1	98
	39									1	1	1	3	3	6	8	12	14	17	5	5	1	6	1	1			85
	40											1		4	5	4	4	5	7	6	5	8	3	2	1			55
	41												1		2	2	3	4	5	6	2	4	4	1	2			36
	42														2	1	1	1	4	1	3		1	1				15
	43																1		1		1	1	2	1		1		8
	44												1			1				1					1	1		5
	TOTAL	1	5	11	16	42	82	119	216	294	384	414	480	414	434	345	264	211	150	83	58	34	22	9	5	2	1	4096

Table G-60

	MEAN	STD DEV
WAIST CIRCUMF	32.083	3.219
VERTICAL TRUNK	64.611	3.573

NO OF CASES = 4096

MULTIPLE R	.63460
R SQUARE	.40271
ADJUSTED R SQUARE	.40257
STANDARD ERROR	2.48776

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	17083.47317	17083.47317
RESIDUAL	4094	25337.46995	6.18893

F = 2760.32845 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
VERTICAL TRUNK	.57166	.01088	.63460	52.539	.0000
WAIST CIRCUMF	4.85249	.70408		6.892	.0000

Table G-61

STATURE BY CERVICLE HEIGHT
CERVICLE HEIGHT

		48	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	TOTAL
	59	1																				1
	61		1	1	1	2																5
	62			1	4	1																6
	63			2	2	4	9	6														23
	64				2	7	14	21	7	1												52
	65				1	1	11	49	47	17	1											127
S	66					1	9	33	94	80	27	1	1									246
T	67					1	2	15	91	142	136	39	1									427
A	68							1	38	127	195	149	53	5								568
T	69								1	42	177	222	127	40	1							610
U	70							1	1	11	67	183	181	133	37	6						620
R	71									1	14	47	166	179	106	22						535
E	72									1	2	2	49	126	102	58	9					349
	73												13	46	67	81	34	12				253
	74													8	24	46	41	19	7			145
	75												1		6	19	26	25	6	1		84
	76															2	7	9	6	2		26
	77																1	4	4	3	3	15
	78																1		2		1	4
	TOTAL	1	1	4	10	17	45	126	279	422	619	643	592	537	343	234	119	69	25	6	4	4096

Table G-62

	MEAN	STD DEV
STATURE	69.527	2.586
CERVICLE HEIGHT	59.402	2.511

NO OF CASES = 4096

MULTIPLE R	.89784
R SQUARE	.80611
ADJUSTED R SQUARE	.80607
STANDARD ERROR	1.13678

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	22073.82186	22073.82186
RESIDUAL	4094	5309.22403	1.29683

F = 17021.36247 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
CERVICLE HEIGHT	.92460	7.08694E03	.89784	130.466	.0000
STATURE	14.60363	.42135		34.659	.0000

Table G-63

WEIGHT BY CHEST CIRCUMF
CHESTCIR

		29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	TOTAL
	95	1						1		1	1		1								5
	105			1	1	2															4
	115		3	3	15	20	4	1													46
	125			6	24	62	65	20	6	4											187
	135				21	63	146	138	65	17	5										455
	145				3	32	97	217	190	115	36	11	3								704
	155					6	35	119	226	197	125	45	8								761
W	165					1	6	39	105	184	149	97	27	7	1	2					618
E	175						1	6	41	80	138	106	71	21	6	1					471
I	185							2	8	27	59	93	71	44	24	4	2				334
G	195								1	4	16	37	57	57	30	15	1	4			222
H	205										5	18	27	39	23	21	6	3		1	143
T	215							1				2	8	13	21	10	16	5	1		77
	225												1	7	7	16	6	5	5		47
	235												1		2	3	2	3	2	1	14
	245																2	1			3
	255																2		1		3
	265																	1			1
	275																			1	1
TOTAL		1	3	10	64	186	354	544	642	629	534	409	275	188	114	72	37	22	9	3	4096

Table G-64

	MEAN	STD DEV
WEIGHT	161.687	23.599
CHESTCIR	37.130	2.635

NO OF CASES = 4096

MULTIPLE R	.84658
R SQUARE	.71670
ADJUSTED R SQUARE	.71663
STANDARD ERROR	12.56224

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1634468.78258	1634468.78258
RESIDUAL	4094	646073.96645	157.80996

F = 10357.19677 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
CHEST CIRCUMF	7.58269	.07451	.84658	101.770	.0000
WEIGHT	119.85754	2.77342		43.216	.0000

Table G-65

WEIGHT BY UPPER THIGH CIRCUMF
UPPER THIGH CIRCUMF

	16	17	18	19	21	22	23	24	25	26	27	28	29	TOTAL
95	1				1	2		1						5
105			2	2										4
115		1	19	20	6									46
125			24	75	87	1								187
135			8	84	344	15	4							455
145		1	4	25	509	136	25	3	1					704
155				1	364	255	117	21	3					761
165			1	1	102	229	199	71	13	1	1			618
175					21	102	170	138	39	1				471
185					7	20	72	127	87	17	4			334
195					1	6	25	76	73	31	9	1		222
205						1	8	21	48	37	24	4		143
215							3	6	25	25	14	4		77
225								1	8	8	19	11		47
235								1	3	3	4	3		14
245									1	1		1		3
255												2	1	3
265							1							1
275													1	1
TOTAL	1	2	58	208	1442	767	624	466	301	124	75	26	2	4096

Table G-66

	MEAN	STD DEV
WEIGHT	161.687	23.599
UPPER THIGH CIRCUMF	22.290	1.854

NO OF CASES = 4096

MULTIPLE R	.84567
R SQUARE	.71516
ADJUSTED R SQUARE	.71509
STANDARD ERROR	12.59635

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1630955.81499	1630955.81499
RESIDUAL	4094	649586.93403	158.66803

F = 10279.04466 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
UPER CIRCUMF	10.76473	.10618	.84567	101.386	.0000
UPPER THIGH CIRCUMF	78.25400	2.37479		32.952	.0000

Table G-67

WEIGHT BY HIP CIRCUMF
HIP CIRCUMF

		30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	49	TOTAL
	95	1						2		1			1								5
	105			3	1																4
	115		4	17	22	3															46
	125			5	71	93	15	3													187
	135		1	1	27	146	215	59	4		2										455
	145				2	51	243	307	92	8	1										704
	155					4	42	287	323	89	12	4									761
W	165					1	4	66	205	235	79	27	1								618
E	175							4	45	169	169	71	9	3	1						471
I	185								3	23	100	131	50	24	2	1					334
G	195									4	16	82	69	39	9	3					222
H	205										3	12	47	42	34	4	1				143
T	215											2	11	22	24	14	3	1			77
	225												1	9	13	16	4	4			47
	235													2	3	4	4		1		14
	245														1	1	1				3
	255															1	1	1			3
	265																	1			1
	275																			1	1
	TOTAL	1	5	26	123	298	519	728	672	529	382	329	189	141	87	44	14	7	1	1	4096

Table G-68

	MEAN	STD DEV
WEIGHT	161.687	23.599
HIPCIRC	37.354	2.538

NO OF CASES = 4096

MULTIPLE R	.92153
R SQUARE	.84922
ADJUSTED R SQUARE	.84918
STANDARD ERROR	.98572

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	22404.45469	22404.45469
RESIDUAL	4094	3977.94741	.97165

F = 23058.08199 SIGNIF F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
WEIGHT	.09912	6.52734E04	.92153	151.849	.0000
HIP CIRCUMF	21.32703	.10666		199.967	.0000

Table G-69

WEIGHT BY WAIST CIRCUMF
WAIST CIRCUMF

	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	TOTAL
95	1					1		1			1			1									5
105			1	1	2																		4
115		1	1	10	15	18	1																46
125			2	14	42	60	51	16	2														187
135			1	7	40	92	160	109	33	11				2									455
145				2	10	59	158	238	164	51	10	9	2	1									704
155					2	11	75	163	235	154	83	27	7	4									761
W 165						2	11	54	120	177	126	81	30	13	3	1							618
E 175						1	2	11	35	86	127	90	66	33	11	7	2						471
I 185							1	2	11	19	44	70	52	67	32	19	14	3					334
G 195									2	3	12	22	42	37	42	29	21	8	3	1			222
H 205										1	1	5	21	18	21	28	24	11	10	3			143
T 215													2	6	13	11	17	18	5	3	1	1	77
225													1	1	3	1	7	10	13	5	6		47
235															1	2		3	4	3		1	14
245															1			1	1				3
255																		1			1	1	3
265																						1	1
275																						1	1
TOTAL	1	1	5	34	111	244	459	594	602	502	404	304	223	183	127	98	85	55	36	15	8	5	4096

Table G-70

	MEAN	STD DEV
WEIGHT	161.687	23.599
WAIST CIRCUMF	32.083	3.219

NO OF CASES = 4096

MULTIPLE R	.86879
R SQUARE	.75479
ADJUSTED R SQUARE	.75473
STANDARD ERROR	11.68729

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1721331.96594	1721331.96594
RESIDUAL	4094	559210.78308	136.59277

F = 12601.92629 SIGNIF. F = .0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	BETA	T	SIG T
WAISTCIR	6.37004	.05674	.86879	112.258	.0000
WEIGHT	42.68148	1.82966		23.328	.0000

APPENDIX H

PROPOSED FORMAT

Table II-1

Suggested Coat Format Generic: X-Short (63-65.49")

Measurement	Chest Circumference[a]										
	32	33	34	35	36	37	38	39	40	41	42
Population											
Median											
Sleeve Length											
Sleeve Inseam											
Arm Scye											
Waist Circumference											
Hip Circumference											
Waist Back											
Mid Shoulder Distance											
Shoulder Length											
Interscye Distance											
Weight											
Full Back Length											
Arm Circumference											

[a] Inches

Table II-2

Suggested Jumper Format Generic: X-Short (63-65.49")

Measurement	Chest Circumference[a]										
	32	33	34	35	36	37	38	39	40	41	42
Population											
Median											
Wrist Circumference											
Sleeve Length											
Sleeve Inseam											
Arm Scye											
Arm Circumference											
Waist Circumference											
Hip Circumference											
Waist Back											
Weight											
Mid Shoulder Distance											
Shoulder Length											
Interscye Distance											
Bicept Flexed											
Dimension to the point below second button on 13-button trouser											

[a] Inches

Table II-3

Suggested Trouser Format Generic: X-Short

Measurement	Waist Circumference[a]												
	27	28	29	30	31	32	33	34	35	36	37	38	39
Population													
Median													
Crotch Height													
Waist Height													
Patela Height													
Hip Circumference													
Hip Breadth													
Upper Thigh Circumference													
Fly Drop													
Knee Height (sitting)													

[a]Inches

Table H-4

Suggested Long Sleeve Shirt Format Neck Size 13½ Inches

Measurement	Sleeve Length[a]						
	31	32	33	34	35	36	37
Population							
Median							
Chest Circumference							
Waist Circumference							
Wrist Circumference							
Hip Circumference							
Arm Scye							
Bicept Flexed							
Shoulder Length							
Interscye Distance							
Waist Back							
Mid Shoulder							
Full Back Length							

[a]Inches

Table II-5

Suggested Coverall Format Generic: X-Small (53-57.49" Vertical Trunk)

Measurement	Chest Circumference[a] 32	34	36	38	40	42	44	46
Population								
Median								
Sleeve Inseam								
Sleeve Length								
Arm Scye								
Waist Circumference								
Hip Circumference								
Upper Thigh Circumference								
Waist Back Length								
Mid Shoulder Distance								
Shoulder Length								
Interscye Distance								
Hip Breadth								
Crotch Height								
Cervical Height								
Neck Circumference								
Wrist Circumference								
Arm Flexed Circumference								
Weight								
Waist Height								

[a]Inches